



FRIDAY, APRIL 5, 1878.

Point Bridge.

IV.
THE ERECTION.

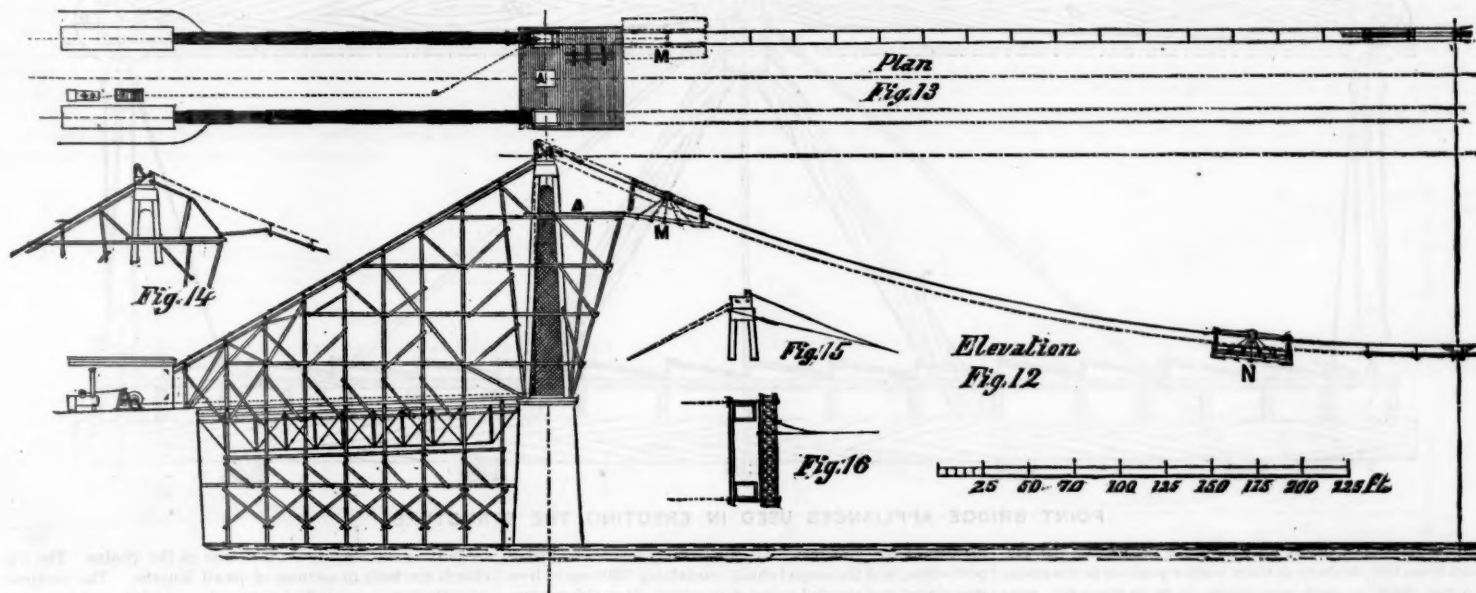
July 1, 1875, the work of constructing the bridge was begun, and at the beginning of the following winter the masonry was well advanced. Early in the spring of 1876 operations were again resumed, and continued without interruption until completion. A great deal of the most difficult work, such as the erection of the chains and stiffening trusses, was prosecuted in midwinter, with the thermometer ranging near zero, and with strong winds prevailing. The bridge was ready for traffic April 1, 1877, and the ornament-

posts braced together and erected inside of the iron-work, so as to allow free swing of the iron columns around it. The iron columns were built in three sections of about 35 feet each, and the single sections were hoisted up, and they were riveted together after being in place. The lattice bars connecting the columns were first bolted to them and riveted after completion of the towers. As soon as the four columns were completed and connected with their bracing, level was taken at their top, and the deficiency in their length was made up by iron plates, planed exactly to the requisite shape, placed on top of each column, so that they made a perfect level bearing for the box girders above, which carry the saddles for the chains. The saddles were placed $1\frac{1}{2}$ in. back from their ultimate position when first connected to the back chains, so that they would take their proper places when the back chains were under strain from the full weight of the middle span.

The erection of the main chains was done from false cables shown in fig. 12, hung from tower to tower, and connected to the back chains. With a view to utilizing the same cables afterward under the floor of the main span to act as wind

lengths and provided with wrought-iron sockets at their ends, were placed upon a scow and brought out to one of the piers. One end of a rope was then hoisted up and connected to the adjusting-screw on top of the tower; then the scow was moved across the river to the opposite tower, unreeling a single rope at a time, which was dropped to the bottom of the river. On approaching the other tower the other end was fastened to a line and was hoisted up and similarly connected. The remaining ropes were stretched across the river in the same manner, and after being in place they were adjusted to hang in equal curves by the bolts connecting with their sockets, three ropes being close together, the other three five feet distant.

The next work done was the wrapping and clamping together of the ropes to form cables of three ropes each. For this purpose two movable scaffolds, *M N*, fig. 12, were used, one on each half-span, hung from the ropes like baskets, large enough for four men and a portable forge. The work of wrapping was commenced in the centre of the span. The ropes were wrapped with wire every 4 feet, and iron bands (*C*), as shown in fig. 19, were fastened at a distance of 20 feet



al work and the painting of the structure were finished during the following two months.

The anchor plates and anchor chains were placed in the masonry during its construction; the north anchor wall and north pier, having first been completed, allowed the raising of back chains, tower and side span on the north side first. The south anchor wall and south pier were completed Sept. 28, 1876, and from that date the erection of the iron work could be carried on without interruption.

Falsework was put in between the anchor walls and the piers, and the iron side spans were erected thereupon, and the falsework of the side spans was afterward carried up to support the back chains, as shown in fig. 12. Independent of the aforesaid falsework there were supports erected from the top-chords of the side spans up to the back chains, as a safeguard in case the bottom falsework under the span should be damaged by flood. This precaution proved to be well founded, as the ice in the river broke during the construction of the main span, and the flood brought ice cakes and barges down the river with great velocity, some of them being wedged in between the falsework, carrying away some of the bottom bents of the falsework remaining supported by the side spans.

The towers and the back chains were erected at the same time; the falsework for the towers consisted of four wooden

cables, they were made of steel wire ropes $2\frac{1}{2}$ in. in diameter. Three of the ropes were wrapped with wire and banded together to form one cable, as shown in fig. 19, and two cables were used for the erection of one chain. The same cables were re-used for the erection of the second chain after the first was finished. The cables were hung above the chain at a distance of 5 feet from each other, as shown in fig. 13, and were connected to the back chains by short link-bars, *E*, and adjusting screws *B*, as shown in figs. 17 and 18. The ultimate strength of both cables was 1,200 tons, and with the whole weight of one chain they were strained to about 400 tons, which strain of course produced a considerable elongation. The deflection due to this elongation was calculated to be 6 feet, and actually was $6\frac{1}{2}$ feet.

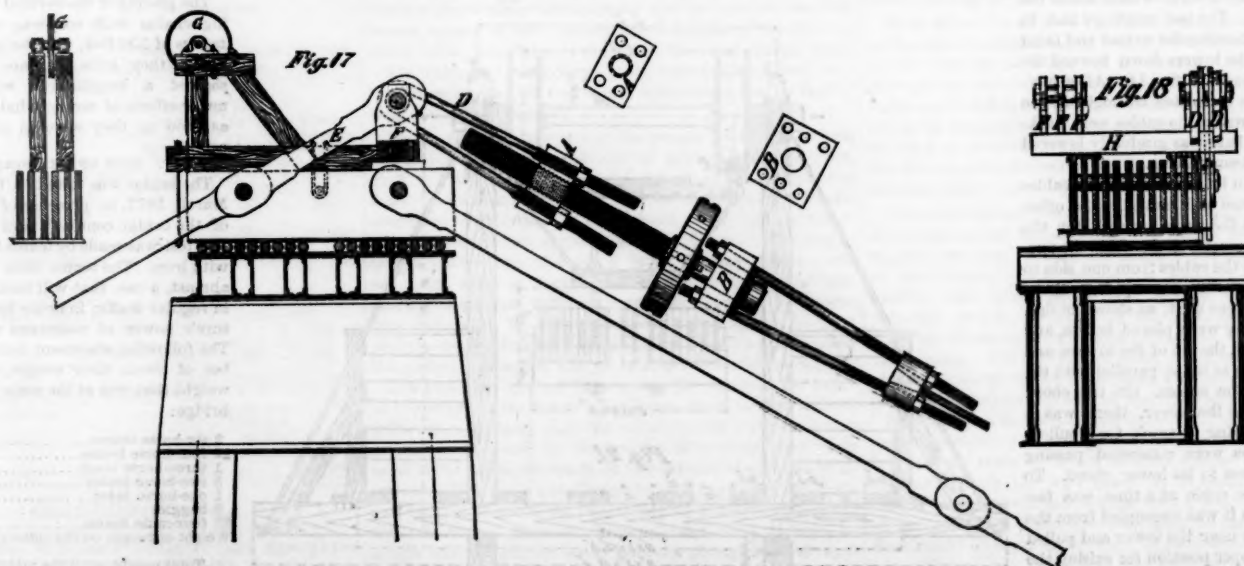
The cables before loaded were hung in the centre 8 feet above their ultimate position; reliance having been had upon the adjusting screws, by means of which the cables with the load could be lowered until the chain was self-supporting.

Preparatory to the swinging of the cables, there were platforms, *A*, figs. 13 and 14, built 25 feet below the top of the towers, as shown, placed between the towers and projecting 28 feet towards the river. From these platforms the adjusting screws were put in place ready to connect with the stirrups of the cables.

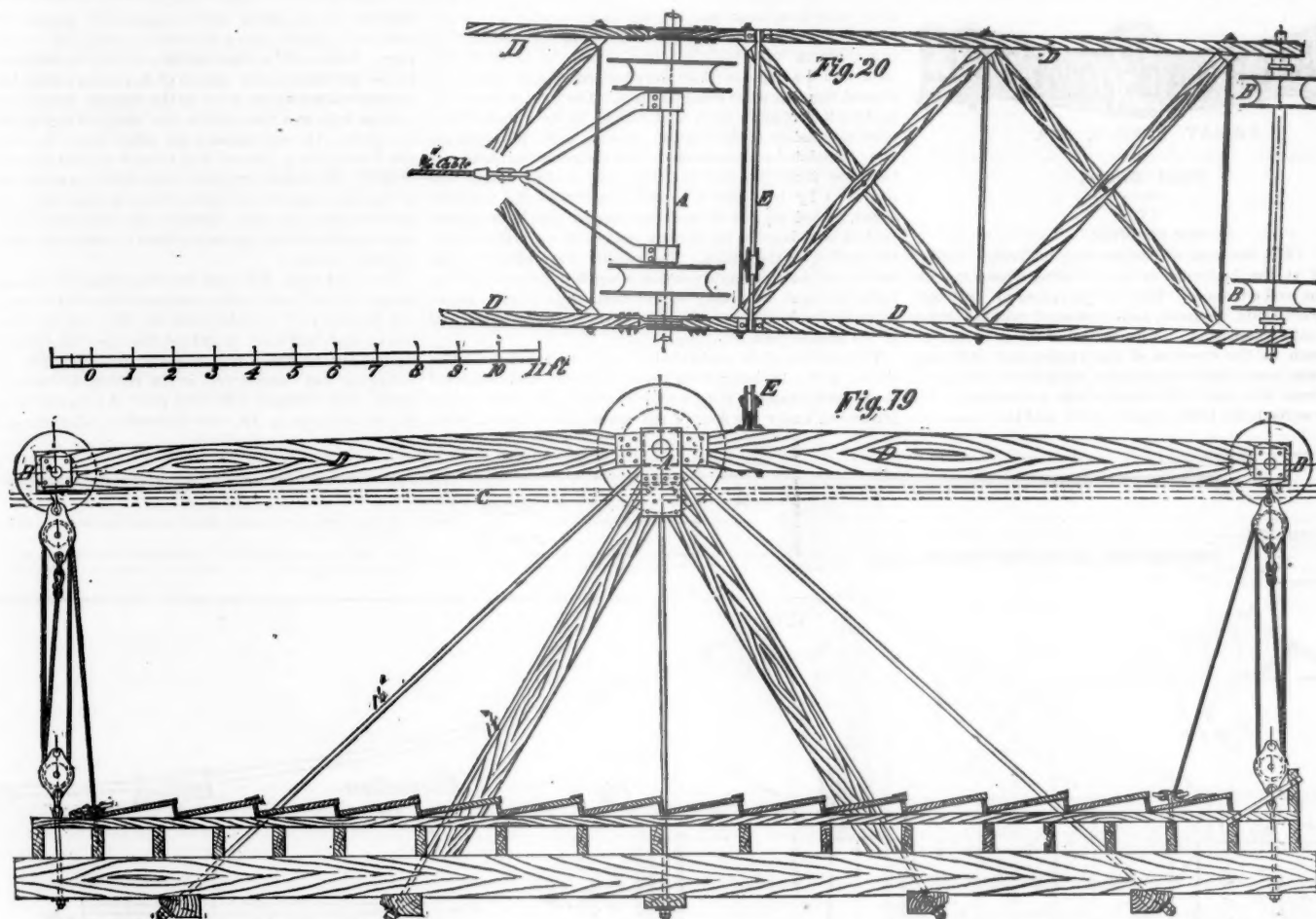
The wire ropes for the cables after being cut off to equal

6 inches from each other, to serve as supports for the hangers, from which the chain-links were suspended. To these clamps there were also attached cross-struts, to connect both cables and to keep them at their proper distance from each other. The scaffolds, from which the wrapping was done, were drawn from the centre of the span toward the top of the towers by wire ropes connected to hoisting-engines placed upon the anchorages. When both cables were wrapped and banded together the ends of the ropes which separately connected them to the large adjusting-screws, were re-adjusted so as to bring them under equal strain.

As soon as the cables were ready, traveling scaffolds, which were put together on the platforms near the top of the towers, were placed upon the cables, one at each tower. The construction of these travelers is shown by figs. 19, 20 and 21. It consists mainly in a platform 18 feet wide and 32 feet long, suspended from a shaft (*A*) which is fitted with two large wheels resting upon the cables, which form the track. To the shaft, *A*, there are connected, by hinged-joint frames, *D D*, which have other shafts with wheels, *B*, at their ends. These wheels also rest on the cables and serve as guides for the traveler as well as for support of the ends of the platform, which is suspended from them by tackles, by means of which it may be adjusted to take different angles of inclination. Across one frame at *E* was placed an iron bar on which two



POINT BRIDGE-APPLIANCES USED IN ERECTING THE STRUCTURE.



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differential pulley-blocks were hung for hoisting up the link-bars from the platform to their proper position in the chain. To the shaft, *A*, steel wire ropes, $\frac{1}{2}$ in. in diameter, were attached and run over a pulley on top of the tower down to the floor of the bridge and back to the hoisting engines.

The iron-work for the main chains was brought from the shores upon the side spans to the base of the towers on cars especially constructed for the purpose, which were drawn by a rope connected to the hoisting-engines. Then the iron was hoisted up between the towers through an opening of the platform *A*, fig. 13, and unloaded thereupon. The traveler was brought in the position shown by dotted lines at *M*, figs. 12 and 13, and the link-bars, necessary pins and connecting pieces for the stiffening truss were moved upon iron rails from the platform on the traveler. The traveler, after being laden, was lowered to the centre of the span, meeting there the traveler from the other half-span. The centre coupling was first made, and about half the number of chain links for the middle section, as well as all the connecting parts for the stiffening trusses, were carried and placed in the first trip. As soon as the coupling was made and the ends of chain links were suspended from the cables, the travelers were pulled up again to the platforms, reloaded and lowered to perform the same operation for the other sections. The first two sections near the towers were put in from the platform, figs. 12 and 13, and all others were placed from the travelers. When the whole chain was thus brought into place, and all the pin couplings were made, excepting the second near the towers, the chain hung about $1\frac{1}{4}$ feet too high in the centre, which made the chain too long. The last couplings had to be made by deflecting the second and third sections from the towers down toward the platform, as shown in fig. 14. After having the chains connected throughout, the adjusting screws on the cables were slackened, and the chain was gradually lowered until it was self-supporting.

The first chain being finished, the cables were disconnected and moved to the other side to serve in the same manner for the erection of the second chain. For the purpose of moving the cables from one side to the other, without unwrapping them, trussed beams were used, as shown in figs. 15 and 16. They were placed before, and a few feet below, the top of the towers, and were inclined so as to be parallel with the inclination of the cables. On the chord of the truss, near the tower, there was a single rail forming a track for a pulley, to which straps were connected passing around the truss to its lower chord. To these straps one cable at a time was fastened, and then it was uncoupled from the adjusting-screw near the tower and pulled across to its proper position for raising the second chain.

The second chain was erected in the same

manner as the first one. All the arrangements worked to perfection, and the second chain, containing 330 tons of iron, was placed and coupled completely within 30 working hours. The two chains were erected in six weeks, Nov. 10 to Dec. 23, counting from the time of stretching the first wire rope across the river.

The lateral struts and ties were next put between the chains, and the suspension rods for the roadway were attached to their stirrups on the chain pins. Meanwhile the roadway trusses were riveted together on the floor of the side spans, in sections of 100 feet each, and as soon as the suspenders were hung, the first sections near the towers were moved out over the piers on rollers and pulled from the chains into their proper places. The iron cross bearers and iron stringers were then put in between the trusses and riveted together. The other sections of roadway trusses were placed in the same manner, and the work of putting in the iron work was followed up by laying the floor and attaching the storm cables to the piers and to the under side of the iron cross bearers. When the whole floor was finished, the falsework under the back chains was taken down and the bridge swung free, being a complete unstiffened chain suspension bridge, the chains hanging in curves due to their load.

A single team passing over the floor at this state of the structure occasioned considerable longitudinal waves, whereas the lateral stiffness was perfect under a wind pressure of about 7 lbs. per square foot occurring at that time. The erection of the stiffening trusses was next commenced

by putting top staging for the same on the chains. The top chords are built in sections of panel lengths. The sections near the towers were first put in place, and riveted to heavy forged cars which were previously coupled in, between the bars of the chains, on the pin over the towers. The work was carried on from the top of the towers toward the centre of the bridge, all sections having been jointed and riveted together, so that the joints were equal in strength to the chord sections. When all sections were placed excepting the four connecting with the centre pins, the chords were adjusted so as to be in line, and to have a slight camber vertically. The exact length of the last section was measured, and the centre sections were then accordingly manufactured and put into their places, thus relieving the chords of the stiffening trusses from any strain arising from the permanent load of the bridge. The weight of the falsework on the chains was nearly equal to the iron work, which was not yet in place at that time.

The length of the posts and tie-rods of the stiffening trusses had previously been calculated, but in order to obtain exact lengths, the tie-rods were provided with turn-buckles and the posts were not drilled at their connection with the gusset plates on the chain pins, until actual measurements were taken of the distances between top chord pins and chain pins. As soon as the posts and tie-rods of the stiffening trusses and their lateral and vibration bracing were in place, the falsework was taken down and removed from the bridge, and then the tie-rods of the stiffening trusses and the floor suspenders were properly adjusted.

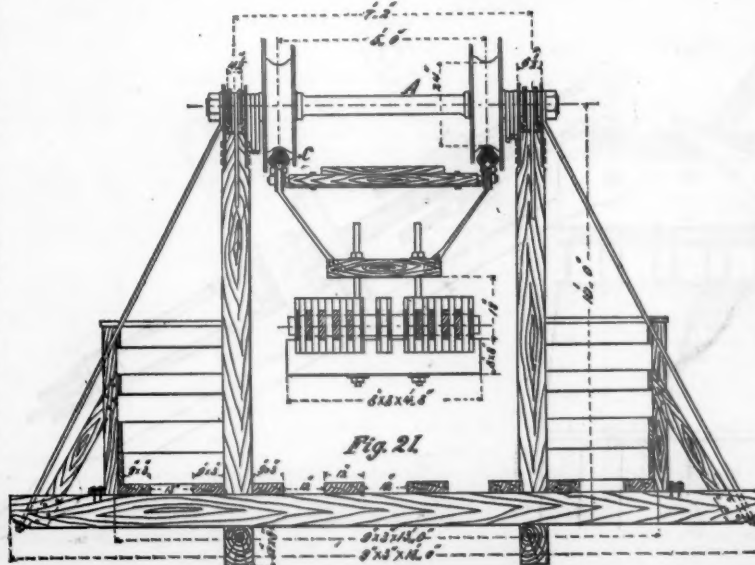
The placing of the vertical posts, connecting chains with roadway trusses in distances of 100 feet, was the last work done; before they were in place the roadway showed a longitudinal waving motion under effects of strong wind, which ceased as soon as they were in place and connected.

TEST OF THE BRIDGE.

The bridge was tested on the 31st day of March, 1877, in presence of the Engineer of the bridge company and other experts. The test was made by teams heavily loaded with iron. The teams were arranged two abreast, a case that will hardly ever occur in regular traffic, in order to test the structure's power of resistance to the utmost. The following statement contains the number of teams, their weight, and the total weight that was at the same time upon the bridge:

	Tons.
2 six-horse teams.....	27
12 four-horse teams.....	120
1 three-horse team.....	8
5 two-horse teams.....	30
1 one-horse team.....	2 $\frac{1}{2}$
2 buggies.....	2
25 four-mule teams.....	225
Weight of people on the sidewalks.....	60

Total weight upon the middle span... 474 $\frac{1}{2}$
The heaviest teams were ahead, and the lightest at the rear, so that 300 tons were



POINT BRIDGE-APPLIANCES USED IN ERECTING THE STRUCTURE.

on half the span at the same time. Altogether there were on the main span, all at one time, 48 teams, with 176 horses or mules, and about 900 people. Under the total load the centre of the main span showed a deflection of 3% in.

When one-half of the bridge was loaded and the other half unloaded, the loaded side deflected $2\frac{3}{4}$ in. and the unloaded side was raised $1\frac{1}{2}$ in., which was simply due to the elasticity of the material.

The most interesting part of the test was the observation of the undulation and oscillation of the bridge under a moving load. For this purpose two level instruments and a transit were used, the levels being placed upon the piers at each end of the main span, and the transit upon the south embankment.

The oscillation could scarcely be noticed, the upward and downward movements during the passage of the load were not over one-sixteenth of an inch, and the lateral motion in the centre of the bridge five-sixteenths of an inch.

The results demonstrated by these severe tests proved the stiffening system of the bridge a complete success.

The work reflects great credit upon the engineer who designed it, and the company which constructed it, and it is now one of the most noteworthy of the many remarkable iron structures erected within the last few years.

In this connection, the following skeleton drawings, showing different plans of rigid suspension bridges which have been constructed or proposed, will be of interest:

It is generally thought to be unprofitable to look backward for anything good, and that any one who turns an eye in that direction is only losing ground. It is an alarming fact, however, that we are daily throwing away what is of vast importance to us morally, socially and politically, for we are a fast people.

But this is not an article on the looseness of our divorce laws, civil service reform, or "the policy," but simply an attempt to show how an "old-fashioned" plan for curving and straightening rails may frequently be used to better advantage than the most approved machines of modern construction.

No construction train is complete in its appointments without a curving and straightening machine among its appliances. Of course it should be of the portable class, or one that can be readily loaded and unloaded. It frequently happens even with careful handling that a rail gets badly bent, from train accidents or otherwise, and it is thrown aside to be straightened and used at some future time. Soon another and then another is left in the ditch to be picked up and carted away at some time or other, or it is left for the section men to take care of; but more than likely it or they (the rails, of course) will be covered with ballast and lost. When only a few rails need straightening the machine may remain on the car and the straightening done there and then, and the rails used up at once, always supposing them to be fit for use; if not, they can be laid aside with other material out of the

estimates and your rule, and measure in the middle of the rail the distance from the rail to the string. If not curved enough turn down the rail and repeat the operation; if curved too much, turn the rail curve upward and with a gentle pressure of the lever and a few light blows of the sledge the curve will easily be made right. To ascertain if the rail is curved uniformly its entire length press the string up to the rail in the middle, and, taking a look toward each end of the rail along the string, you can readily see if one "quarter" of the rail is curved more than the other or if the curve is a true one. If not, you can remedy this by moving one or the other of the ties or the lever, as may be needed to bring the pressure from the lever to that portion of the rail needing more curvature or *vice versa*. If you are a little dim of sight and want to be sure about the accuracy of the curvature midway between the middle and the ends of the rail, measure at those two points, and if the measurements agree the curve is a true one. Get the middle ordinate right, according to the table in your pocket-book; then, when the measurements at the quarters correspond, the job is right. For some operators it is best at the beginning of the operation to take your tape line and measure one-quarter the length of the rail from each end, and make a chalk mark there, also in the middle, so that the measurements can be taken correctly by measuring at these points. If the rails are long and light, but little pressure will be needed on the lever and but little pounding necessary.

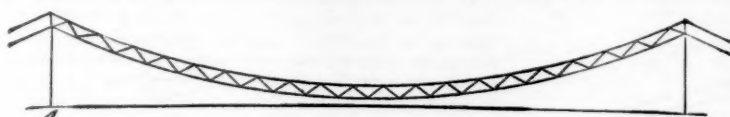


Fig. 22.
RAILROAD BRIDGE ACROSS THE DANUBE CANAL AT VIENNA.
260 feet span, built in 1859. Strains uncertain.



Fig. 23.
PROPOSED BY C. KÖPCKE IN 1860.
London "Civil Engineers' and Architects' Journal," Jan. 1, 1861. Chains are hung in a catenary and are self-supporting, the stiffening members being placed below the chains.

Strains with full load		tension in T and T'
$\frac{1}{6}$ $\frac{1}{6}$ half $\frac{1}{6}$	on $C D$.	$\frac{1}{6}$ $\frac{1}{6}$ T T'
$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$		$\frac{1}{6}$ B
$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$		compression in B'



Fig. 24.
LAMBETH BRIDGE, THAMES, LONDON, BUILT 1862.
BRIDGE ACROSS THE MAIN AT FRANKFORT, BUILT 1869.
Chains hung in the catenary and are self-supporting; stiffening members being placed below the chains.

below the chains.

With full load.....		tension in T and T'
“ half “ on $C D$		“ “ T “ T'
“ “ “ “ “ “.....		“ “ B
“ “ “ “ “ “.....		compression in B'



Fig. 25.
EADS' ARCHED BRIDGE REVERSED.
Chains hung in a catenary and are self-supporting; the stiffening members being placed above the chains.

With full load		on <i>C D</i>		tension in <i>B</i> and <i>B'</i>	
"	half	"	"	"	"
66	66	66	66	66	66
66	66	66	66	66	66
66	66	66	66	66	66



Fig. 26.
POINT BRIDGE, PITTSBURGH, DESIGNED BY EDW'D HEMBERLE, C. E.
Chain hung in a catenary and are self-supporting; the stiffening members being placed above the chains.

With full load	tension	in B and B'
" " "	no strains	" T " T'
" half " on C D	tension	" B " B'
" " " "	"	" T "
" " " "	compression	in T



Fig. 27.
PLAN PROPOSED BY T. CLAXTON FIDLER.

London "Engineering," April 30, 1875. Catenary through the centre line of the truss; none of the chord members of the trusses are self-supporting. Tensile strains in all chord members under all conditions of load.

The following are the quantities of materials used, weight of ironwork for different parts of structure, and cost of the bridge:

The Quantities of Material used in the construction of the bridge	
Rip rap and stone filling.....	2,900 cubic yards.
Timber in foundations.....	1,442,000 feet, board measure.
Iron in foundations.....	42 tons.
Masonry in anchor walls.....	10,888 cubic yards.
Masonry in piers.....	7,507 "
Wrought iron.....	2,014 tons net.
Cast iron.....	52 "
Steel.....	32 "
Timber in roadway.....	240,000 feet, board measure.

Detailed Weight of Superstructure is as follows, viz.:

	Wrought Iron.	Cast Iron.	Steel.
	net tons.	net tons.	net tons.
Two 145-ft. side spans	149	2.2	
Anchorage, backchains and their pins	472	24.0	
Towers	324	20.4	14
Main chains between towers	552		
Pins for main chains	19		
Stiffening trusses	195		
Lateral bracing between trusses	51		
Suspender	40		
Roadway trusses	74		
Iron floor-beams and stringers	87		
Hand-rails, track and sundry	51	5.4	
Cables under floor			18
Total.	2,014	52	32

<i>Cost of the Bridge is as follows, viz.:</i>	
Masonry and foundations.....	\$199,500
Superstructure.....	270,000
Approaches and sundry	55,500

Contributions.

One of the Lost Arts—How to Curve and Straighten Rails Without a Machine.

TO THE EDITOR OF THE RAILROAD GAZETTE:
In this age of progress it is unusual for writers whose aim is to keep pace with the march of improvements (or, perhaps, take a step in advance) to turn backward in the path and gather up what has been thrown aside as useless.

way where they will be sure to be gathered up and saved for some use.

But it frequently happens that a few men are sent, or left, to put in a switch, and it is inconvenient for them to have the machine, and, as a novel-writer would say, in describing a picnic, they must "improvise."

This the tracklayers can do by bringing into requisition the few simple tools mentioned for that purpose on page 24, second edition of the "Roadmaster's Assistant," to wit: "A chain, lever and sledge, a couple of ties and a fishing line."

The method of using these tools was not described, as it was thought that all track-men understood the method of their use for the purpose.

There are those, however, in the present generation, whose experience is confined to the use of modern improvements, that will be glad to learn the details of this simple but thorough method of weaving. All the tools necessary for the

through method of curving. All the tools necessary for the operation will be found in the tool-box of any gang of trackmen, if we except a piece of chain three or four feet in length. One the size of a stout logging chain will do. Be sure to have this chain in your tool-box, and if you are not different from the average track-layer you will never be caught without a fishing-line in your pocket—especially if you are in a trout country. Supposing this to be the case you will proceed as follows to curve rails:

Get two ties and lay them across the track as far apart as the length of the rail to be operated upon, so that its ends will rest on the ties. Lay the rail on its side 6 or 8 in. inside of one of the rails in the track. Now hook your chain around the rail in the track at the middle of the rail to be curved. Now put a stout lever through the loop of the chain and bring it down on the rail, springing it downward. Keep the rail under pressure while a man goes through its length with a sledge or heavy hammer giving blows at regular intervals. Now release the rail and turn it surface upward and unwind your fish-line (of course any strong, smooth twine will do) and have a man at each end of the rail hold the twine taut against the side of the rail-head on the inside of the curve. Of course the twine will show how much the rail has been curved by the operation. Get out your table of

to make the curve, but for heavy rails it may need the weight of two men on the lever and some smart blows of the sledge to do the business. The blows should be heavy near the ends and light in the middle of the rail. With a little practice, rails of any weight and length may be nicely curved and made correct at the first "pounding," or very nearly so, and the operation is a much shorter one than would be supposed by reading this explanation.

Some use a "track hook" made of $1\frac{1}{2}$ in. round iron, bent to the form of an inverted U, with a hook turned on the lower end of each leg to fit the web of the rail. This is used in place of the chain. With this curving apparatus very bad kinks can be taken out of rails, and when they are bent too bad to be straightened cold, they may be readily heated for the purpose of straightening, and it is frequently better to do this than to send the rail to the shop, which it is sometimes impracticable to do.

The combined machines for curving, slotting, punching and straightening are recommended for use at the base of rail supplies, but the curving for main track should be done at the front. Rails should be handled as little as possible after being curved. Of course the curving for turnouts should be done on the spot, and very many times the simple apparatus described above would best serve the purpose. For curving for main track the portable machine may be taken from the train and set up at a pile of rails, when they can be curved and carefully loaded on the "iron cars" at the proper time for use. If the work is being done in something of a hurry, the rails may be curved and laid in a pile ready to be loaded when wanted without causing any delay to the iron gang. If it requires a part of a load of straight rails to reach the curve, a sufficient number of curved rails to make up a load may be loaded first and the straight ones put on the top. If the curve is a compound one, sufficient rails to reach the P. C. C. may be curved and marked with chalk and so loaded with others of different curvature that they will come off the car at the proper time and place. With a little calculation this work may be done with no detention to the iron car and the rails laid around compound and reverse curves as readily as on tangents.

This is to be observed in laying new track; for renewing it is usual to distribute the rails in piles from the train and carry them to place with a "lorry car." After this has been done the curving may be done with the lever and sledge, before commencing to "shift," so that that operation will not be interfered with.

To those on the prairie railroads this may seem like a good deal of talk on a worthless topic, but there are thousands of track-men among the mountains, where a single mile of tangent is considered almost a Godsend, who can turn the foregoing bit of information to a profitable account. There are a great many roads now improving their tracks by laying a few miles of new rails, and there are a great many short branches being built from main lines, and hundred of gangs of track-men are working here and there among curves who are not provided with all the good things of this world, and would be glad to learn how to curve rails without a machine. For yard work, the above plan for curving rails is superior to any machine for the purpose, but it is advisable for most roads to be provided with a combined, stationary machine, and a portable one for the construction train.

WM. S. HUNTINGTON.

The Running Gear of Cars.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your editorial on the "Running Gear of Cars," in your current issue, you have fallen, doubtless by inadvertence, into an important theoretical error in the following statement:

"A great deal has been said, too, about the pressure of the flanges of the wheels against the outer rails. This is much less than is ordinarily supposed, and is in proportion to the sine of the angle of the wheels to the rails to the radius. Thus with a 6-foot wheel-base, the angle of the wheels to the rails on a curve of 600 ft. radius is 17 minutes, and the sine of this angle is 0.005, so that if a car is pushed forward with a force equal to 12 pounds per ton the lateral pressure exerted by the flange of the front wheel would be $12 \times 0.005 = 0.06$ lb. for each ton of weight on the truck. If the weight of the car is ten tons on each truck, the pressure against the flange will be 0.6 of a pound—a pressure very much less than the lateral pressure is ordinarily supposed to be."

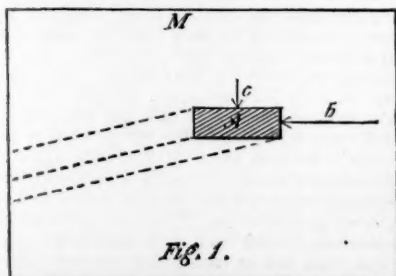
The error in this statement is that it confuses the purely static pressure of the flange against the rail with the consumption of the dynamic energy which results from that pressure. The latter only is in proportion to the sine of the angle of the wheel to the rail; the pressure of the flange against the rail is wholly independent of it. A moment's reflection will show this. At each instant of time the wheel must be slidden laterally upon the rail a certain minute distance. However minute this distance, it must be produced by a force adequate to slide the wheel on the surface of the rail, and this force is and can be supplied only by the reaction of the rail against the flange. Therefore, giving your assumptions of 10,000 lbs. load per wheel and a co-efficient of friction of one-fourth, the flange pressure will be $10,000 \times \frac{1}{4} = 2,500$ lbs., instead of 0.06 lb., as you compute it. As a matter of fact, however, the co-efficient of 0.25 is probably true only for very heavy loads per wheel, as in locomotive drivers, and for ordinary car-wheels it is probably not more than 0.15, giving 1,500 lbs. as the flange pressure.

That the pressure must be something very near this amount is at once practically evident from the abrasion which takes place on the inside of the outer rail on curves. The first necessity for abrasion is pressure, and you will at once perceive that the rail and wheel might rub together to all eternity without producing sensible abrasion if they were pressed together by no greater force than 0.06 of a pound.

I will add a word more as to another matter. You compute the resistance due to slipping of wheels on a curve of 600 feet radius ($9^\circ 30'$) as equal to a grade of 6 feet per mile, and the additional resistance from the lateral slipping of wheels with ordinary trucks as equal to an additional grade of 4 feet per mile, or 10 feet per mile in all. Immediately below this you state that "the circumferential slipping of wheels is, however, in practice, so very slight that it is not worth considering," and that the cause of the lateral slipping "is, with ordinary trucks, not a difficulty of any practical importance." In view of the notorious fact that sharp curves are freely used on the rising grades of a majority of railways, it would be interesting to know how nearly worthless it would be, in the opinion of the editors of the *Gazette*, to reduce the ruling grades of such roads by 5 or 10 feet per mile, and how many feet per mile reduction would be considered necessary to constitute an improvement "of any practical importance" and "worth considering."

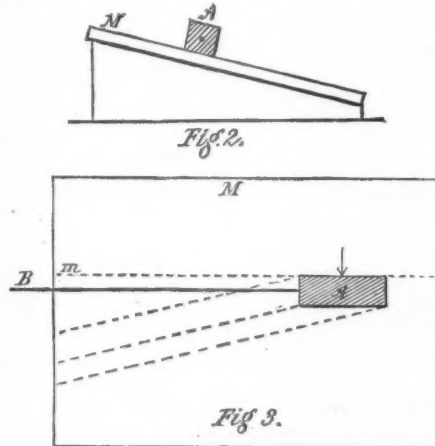
A. M. W.

[It is to be feared that our correspondent has not reflected on the "theoretical error" referred to above sufficiently, as Mulberry Sellers says, to "grasp the subject." To show that his correction is not correct, let it be supposed that we have an iron weight, A, fig. 1, weighing say 20 lbs., and placed on a smooth



surface, like a drawing-board, and that it will require a force of 5 lbs. to slide it on the board. Now, sup-

pose that a force, $b = 5$ lbs., acts against the weight in the direction indicated by the dart, and at the same time a force, $c = 1$ lb., acts against the weight at right angles to the first, as shown. If under the action of these forces the weight should move in a path which is the resultant of the two, according to our correspondent, whose language we change slightly to apply to fig. 1, "at each instant of time the weight must be slidden laterally a certain minute distance. However minute this distance it must be produced by a force adequate to slide the weight on the surface of the board, and this force is and can be supplied only by the action of the force c against the weight A ." Therefore, giving the assumptions of 20 lbs. weight and a co-efficient of friction of one-quarter the side pressure, c must be $20 \times \frac{1}{4} = 5$ lbs. to slide it diagonally in the path indicated by the dotted lines, instead of in the line in which it would be moved by the force b above. In other words, according to the reasoning of "A. M. W.," in order to slide the weight A in the direction of the dotted lines, which is a resultant of the two forces, it must be produced "by a force adequate to slide" the weight on the board, or to be $20 \times \frac{1}{4} = 5$ lbs. That this will not be the case he can easily convince himself by inclining the upper edge, M , of his board as shown in the end view, fig. 2. Then draw a horizontal



line, $m n$, fig. 3. on the board and place the weight so that one of its edges conforms to the line. Now if a twine, $B A$, three or four feet long, is attached to the weight, and the latter is drawn from the end B of the twine in a direction parallel to the line $m n$, the inclination of the board, if it be in the proportion of 1 in 20, will exert a side pressure on the weight in the direction of the dart $c = 1$ lb. Notwithstanding the fact, however, that this force is not "adequate to slide" the weight, the latter cannot be induced to move along the line $m n$ if the force $A B$ is exerted parallel to it at the end B of the twine and the weight is thus free to slide in the direction in which the force c acts, but it will move downward, as indicated by the diagonal line $C A$, the direction depending upon the inclination of the board. A four-wheeled truck will act in a similar way, showing that in order to be moved sideways it is not necessary that the force exerted in that direction should be "adequate to slide the wheel," but that any force, acting in that direction, however minute, will move the wheels in proportion to its own magnitude; or, conversely, if the distance to be moved is minute, as is the case with car wheels on curves of the usual radii, the force required is in the same proportion.

There is another way, too, in which the fallacy of the reasoning of our correspondent can be shown. If the pressure of the flange against the rail is 2,500 lbs., as he suggests, it would require as much force to overcome the friction between the two as it would if there were a small brake block pressing against the flange with an equal force. With a co-efficient of one-quarter, the friction with 2,500 lbs. on the flange would amount to 615 lbs., so that with the assumption of a weight of 20,000 lbs., or ten tons, on each truck, it would make the resistance due to this cause alone 62.5 lbs. per ton, whereas we know that on ordinary curves the total resistance is less than this. "A. M. W." suggests that the co-efficient is only 0.15; his reasons are not given, and the fact does not accord with the experience in running locomotives, which will always draw heavier loads than the record data indicate.

It is also true that if the pressure of the flanges of wheels was as great as our correspondent estimates, the number of wheels which would fail from worn-out flanges would be much greater than it now is. At present failure from this cause is the exception and not the rule, and is always attributed either to inaccurate adjustment of the axles or to mismatched wheels.

With reference to the value of diminished resistance on curves, it may be said that if the heaviest grades

and the sharpest curves occur simultaneously, an increase of resistance in curves equivalent to a grade of 10 ft. per mile is important, but if the grades in the curves are made 10 ft. per mile less than in the straight line, it is not. We believe though that it would be more economical to spend money in securing such an alignment of road than it would to invest in expensive and more or less complicated running gear of cars.—EDITOR RAILROAD GAZETTE.]

Bridge Accidents.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the paper on "Railroad Bridge Accidents" by T. Appleton, C. E., published in your issue of Feb. 22, I notice some curious statements. Mr. Appleton gives the following summary of accidents of various styles of bridging since December, 1872:

Pile or other trestles	57 accidents.
Howe truss	38 "
Combination truss	5 "
Iron bridges	17 "
Unknown	66 "
Total	183 accidents.

Immediately beneath this table is the following remark:

"Upon studying this table we perceive that trestle and pile bridges are exceedingly dangerous structures, as more than one-half the number of accidents, where the material of the bridges was known, occurred on them."

Mr. Appleton's arithmetic would appear to be a little at fault, for the aggregate number of known accidents only was 60 as against 57. But it is also to be remembered that at least 50 out of the 66 bridges of "unknown" character were probably truss bridges, it being quite uncommon to describe trestles unqualifiedly as a "bridge." If so, it would appear that not more than one-third of the accidents were to trestles.

Mr. Appleton's evident belief, however, is that the aggregate of the trestle bridging in the country is much less than of other bridges; for otherwise his table would not under any circumstances afford grounds for pronouncing them "exceedingly dangerous." Doubtless this impression is true enough for the neighborhood of Boston, but on turning to the Ohio and Michigan State reports I find there are:

	In Ohio.	In Michigan.
Trestles	129,789 feet.	93,650 feet.
Wooden bridges	89,147 "	75,928 "
Iron bridges	10,118 "	4,514 "
Combination bridges	856 "	"
Stone bridges	8,197 "	2,260 "

I have no other State reports at hand which give these statistics, but throughout the South and West the length of wooden trestles is very largely in excess of that of all other bridging combined, and, taking the whole country at large, it is probably fully equal. It may be that the number of trestle train-miles is considerably less than of bridge train-miles, but after making all allowances there is abundant evidence in Mr. Appleton's own table that a WELL-CONSTRUCTED wooden trestle is one of the staunchest and safest, as it is certainly the cheapest and most convenient, method of crossing obstructions. To judge by several volumes and papers which have appeared of late years, it would seem to be a prevalent illusion in longitude east from Washington that "the day of wooden trestles is past." So far from that, they will continue for a century to come to be a necessity of life on many railroads, and judicious economy on many others. Their defects are not at all inherent in the type, and it would seem far wiser to preach the gospel of sound construction than to decry their existence.

Mr. Appleton also states:

"If Howe truss bridges were built as strong as iron ones, there would be very few of them built, on account of their cost. Placed on the basis of equal strength, the cost of an iron bridge would not exceed that of the wooden bridge by more than ten per cent."

With all due deference to Mr. Appleton, I doubt if he can substantiate that statement by any estimates which engineers will accept as fair. It would be interesting to know what sections he would regard as giving "equal strength" in any given truss, and what he would regard as the probable cost of two such structures. It is more than likely that the wooden bridges throughout New England are not up to the standard which prevails in the West, having been at first designed for far lighter loads and since copied as precedents.

A. M. W.

The Chicago Meeting for Dividing East-Bound Traffic.

To confer upon, and, if possible, to carry out the agreement made at New York, March 7, regarding an apportionment of east-bound traffic for three months, in proportions to be fixed by Commissioners Fink and Guilford, in case the roads concerned could not agree, a meeting of representatives of Western railroads was held at the Grand Pacific Hotel, Chicago, beginning on the morning of Tuesday, March 26.

Gen. J. H. Devereux, of the Atlantic & Great Western and Cleveland, Columbus, Cincinnati & Indianapolis, presided, and N. Guilford, Western Commissioner, acted as Secretary.

Mr. Albert Fink, Trunk Line Commissioner, was present as arbitrator.

Mr. Guilford, the Western Commissioner, reported that besides the companies represented at the New York meeting, the following had signed the agreement:

Indianapolis, Cincinnati & Lafayette.
Indianapolis, Peru & Chicago.
Atlantic & Great Western.
Indianapolis, Bloomington & Western.
Toledo, Peoria & Warsaw.
Chicago, Rock Island & Pacific.
Peoria, Pekin & Jacksonville.
Illinois Midland.
Chicago, Pekin & Southwestern.

The chairman, having announced that the principal object of the meeting was to fix upon the proportion of the total east-bound tonnage from each competitive point that should be allotted to each of the roads competing for it, appointed as committees for each city the representatives of the roads

carrying east-bound freight from that city, with chairmen as follows:

Chicago.—H. B. Ledyard, Michigan Central.
Milwaukee.—H. C. Potter, Flint & Pere Marquette.
Detroit and Port Huron.—L. J. Sergeant, Grand Trunk.
Toledo.—John Newell, Lake Shore & Michigan Southern.
St. Louis and Mississippi River Points.—J. E. Simpson, Vandalia Line.

Louisville, Cincinnati, Evansville and Cairo.—John King, Jr., Ohio & Mississippi.

Peoria.—George B. Wright, Indianapolis, Bloomington & Western.

Indianapolis, Lafayette and Columbus.—Wm. Stewart, Pittsburgh, Cincinnati & St. Louis.

On motion of Mr. Ingalls it was resolved that the chairmen and commissioners should cooperate with the several committees, furnishing such statistical information as they might have concerning the east-bound traffic from their respective points.

The meeting then adjourned until 5:30 p. m. to enable the committees to determine the divisions.

On re-assembling, Mr. Ledyard, of the committee on *Chicago* divisions, reported that the roads having failed to agree upon their percentages, they had submitted the matter to the arbitration of the Commissioners, who had assigned the following percentages:

To the Michigan Central.....	32 per cent.
Lake Shore & Michigan Southern.....	27 "
Pittsburgh, Fort Wayne & Chicago.....	24 "
Baltimore & Ohio.....	10 "
Pittsburgh, Cincinnati & St. Louis.....	7 "

Mr. Potter, of the *Milwaukee* committee, reported that three of the four lines which carry from Milwaukee were represented, but the Detroit & Milwaukee was not, and that on that account it was thought impracticable for them to make any division; but the roads represented desired to express their cordial approval of the efforts of the Commissioners to harmonize differences and to pledge themselves to a strict maintenance of east-bound rates, subject, of course, to the concurrence of the Detroit & Milwaukee.

Mr. Sergeant, of the committee to consider the percentages of *Detroit and Detroit Junction* shipments via Buffalo and Suspension Bridge to be allotted to the Grand Trunk, the Great Western and the Canada Southern, respectively, reported that by reason of the failure of the Great Western to report statistics of its traffic to the Commissioners, and in the absence of any representative of that road, they had found it impossible to compare figures and discuss divisions. But in order that the benefits of an advance might be secured immediately, they recommended that the traffic in question be divided in proportions equal to those which the roads have had of this traffic for the past three years, 1875, 1876 and 1877; and that in case of failure of the roads to agree, the decision be left to Commissioners Fink and Guilford.

The Canada Southern claiming that its proportion should be considered in connection with an amendment of the present agreement of the Erie & North Shore Dispatch, it was agreed that the facts might be submitted to the Commissioners prior to their award.

Mr. Newell, of the *Toledo* committee, reported that no conclusion had been arrived at, owing to the absence of representatives of two of the lines. A meeting of all the Toledo lines would be held at an early day, however, and in case of disagreement the whole matter would be referred to them for final decision.

Mr. Simpson, of the committee on *St. Louis, Hannibal and Quincy* shipments, reported that the five St. Louis lines had agreed upon an equal division of the shipments from that city, that is, 20 per cent. each to the Ohio & Mississippi, the Vandalia Line, the Indianapolis & St. Louis, the Wabash, and the Chicago & Alton. The lines from Quincy and Hannibal had not yet agreed, but if they did not before the meeting adjourned the matter would be left to the Commissioners.

Mr. King, of the committee on *Cincinnati, Louisville, Evansville and Cairo* shipments, reported that the several roads interested with the exception of the Cincinnati, Hamilton & Dayton, were represented. The basis of division was in conformity with a resolution passed at Cincinnati, March 18: "That all business from Cincinnati and points beyond, except that coming from or through Louisville, Indianapolis, Peoria, St. Louis, or other Mississippi River points, all rail, be reported as Cincinnati business, no matter whether billed through or not." The percentages fixed were:

Marietta & Cincinnati.....	35
Pittsburgh, Cincinnati & St. Louis.....	20
Atlantic & Great Western.....	20
Cleveland, Columbus, Cincinnati & Indianapolis.....	20
Cincinnati, Hamilton & Dayton.....	5

The Louisville lines were represented with the exception of the Louisville Mail Line—the steamboat line. The Louisville shipments were divided as follows:

Jeffersonville, Madison & Indianapolis.....	45 per cent.
Ohio & Mississippi.....	31 "
Louisville, Cincinnati & Lexington.....	24 "

This was subject to an arrangement which it is hoped can be made hereafter with the Louisville Mail Line, by which that line will become a party to the apportionment. Failing that, the lines from Cincinnati will charge the full rates on all Louisville business received by steamer.

The two lines from Cairo (Illinois Central and Cairo & Vincennes) were found to be in harmony as to rates from that point, and there was no need to agree upon a division.

There was no representation of the Evansville & Crawfordville Railroad present, and that is the only route leading out of Evansville. The committee recommended that the rates from that point be made so as not to interfere with the apportionment at Louisville and Cincinnati.

Mr. Wright, of the *Peoria* committee reported that the roads had been unable to agree upon their share of the traffic and had placed the matter in the hands of the Commissioners for arbitration.

Mr. Stewart, of the committee on *Lafayette, Indianapolis and Columbus* shipments, reported that the Lafayette apportionment had been postponed by reason of the absence of any representation of the Lafayette, Muncie & Bloomington road.

Indianapolis business was divided in the following proportions:

Cleveland, Columbus, Cincinnati & Indianapolis.....	40 per cent.
Pittsburgh, Cincinnati & St. Louis.....	26 "
Indianapolis, Cincinnati & Lafayette, and Cincinnati, Hamilton & Indianapolis.....	17 "
Indianapolis, Peru & Chicago.....	17 "

As to Columbus business, no agreement was reached. The tonnage for the past three years had been carried in the following proportions, according to the statistics furnished the committee:

Pittsburgh, Cincinnati & St. Louis.....	57.3 per cent.
Cleveland, Columbus, Cincinnati & Indianapolis.....	23.7 "
Baltimore & Ohio.....	19.0 "

The committee had determined to have a statement of local tonnage from Columbus made up for three years, on the basis of which they would divide such business.

These committee reports were then received, confirmed and adopted by the meeting, and it was agreed that the committees with their chairmen should continue to act until further notice.

Mr. Hurlbut, of the Cleveland, Columbus, Cincinnati & Indianapolis, then offered the following resolution, which was unanimously adopted:

Resolved, That we hereby pledge ourselves to abide by and carry out the divisions; and in case of any roads getting any excess of its division of tonnage, the Western Commissioner is authorized to equalize the same.

The meeting then adjourned until Wednesday morning.

On re-assembling Wednesday morning, Mr. Newell reported that the Toledo committee had arranged to meet early the next week to fix upon the divisions.

Mr. Wright reported that an agreement had been reached with regard to the Peoria divisions.

Mr. Stewart reported the same of the Lafayette divisions.

Mr. Simpson reported an agreement as to the divisions at the Mississippi River points above St. Louis.

These reports were adopted.

The chairmen of the several committees were then constituted a special committee to report upon the rates which it would be advisable to fix. After a recess for an hour this committee reported that the fourth-class rate of 30 cents per 100 lbs. from Chicago to New York be maintained; and that at competing points the roads, by agreement of their managers, be authorized to make special rates on grain, flour, pork and lard in barrels and tierces, and also fertilizers in barrels on a basis of not less than 25 cents per 100 lbs. from Chicago to New York. Also that the first-class rates be made \$1.20, the second-class 90 cents, and the third-class, 70 cents from Chicago to New York, and on that basis from other points, all these rates to go into effect April 1.

This report was adopted.

The report also confirmed a special notice of March 19, signed by J. A. Grier, General Freight Agent, Michigan Central; R. C. Meldrum, General Western Freight Agent, Pittsburgh, Fort Wayne & Chicago; Charles M. Gray, Assistant General Freight Agent, Lake Shore & Michigan Southern; D. T. McCabe, Division Freight Agent, Pittsburgh, Cincinnati & St. Louis; and C. M. Wicker, Assistant General Freight Agent, Baltimore & Ohio. This notice, directed "to shippers of butter, eggs, poultry, game, and other high-class freights," reads as follows:

"All rebates, drawbacks and commissions will be discontinued on April 1 next, after which date rates will be uniform by all lines; contracts will be terminated and no new contracts made by the roads or lines we represent. Parties interested will notice the fact and govern themselves accordingly."

This notice governs all the freight lines over the roads named.

The sub-committees on rates reported the following rates to New York from the several places named for fourth-class freight and grain in cents per 100 lbs.:

	4th class.	Grain.
Chicago.....	30	25
East St. Louis, Quincy and Hannibal.....	35	29
Peoria.....	32 1/2	27 1/2
Detroit and Toledo.....	32 1/2	18
Indianapolis.....	27 1/2	23
Lafayette, Ind.....	30	26

Cincinnati, Richmond, Dayton, Osborn, Enon, Springfield, Bowlingville, Tremont, Urbana, Xenia, Washington, C. H., Portsmouth, Chillicothe, Circleville, Lancaster, Athens, 25 21

Columbus, Newark, Mt. Vernon, Mansfield, Milford Centre, Marion, Gallon, Crestline, Cambridge, Zanesville, Marietta..... 23 20

Louisville, New Albany and Madison..... 24 1/2 24

Evansville and Shawneetown..... 32 1/2 27

Cairo..... 30 30

The usual differences to be made to Boston, Philadelphia and Baltimore, and the rates on the three higher classes to be made on the basis recommended by the Committee on Rates, namely, \$1.10, 90 cents and 70 cents respectively, from Chicago to New York.

These rates were adopted.

It was resolved that the daily reports to the Western Commissioners be furnished only to the initial roads at the respective points of division.

The Chairman called attention to the advantages of local organizations in the respective cities through which the freight officers could freely exchange views. Such committees, through their secretaries, would also afford a convenient means of prompt communication with each other or with the Commissioner upon any point of common interest which might arise. He hoped that such committees would be organized at each city.

The meeting then adjourned, subject to the call of the Chairman.

Southern Railway & Steamship Association.

At the called meeting in Atlanta, March 14, to which reference has heretofore been made, there were present Hon. Joseph E. Brown, President; Virgil Powers, General Commissioner; Charles A. Sindall, Secretary; and the following members:

W. M. Wadley, President; Wm. Rogers, Superintendent; G. W. Sorrell and C. I. Brown directors Central Railroad of Georgia.

W. G. Raoul, Superintendent, Southwestern Railroad.

Joseph E. Brown, President; E. W. Cole, Vice-President; Wm. McRae, Superintendent; R. A. Anderson, General Freight Agent, Western & Atlantic Railroad.

J. P. King, President; S. K. Johnson, Superintendent; E. W. Cole, director, Georgia Railroad and Macon & Augusta Railroad.

E. P. Alexander, General Manager, and S. B. Hubbard, General Freight Agent, Western Railroad of Alabama.

R. R. Bridges, General Manager, and A. Pope, General Freight Agent, Wilmington & Weldon, Wilmington, Columbia & Augusta, and Charlotte, Columbia & Augusta Railroads.

D. C. Wilson, Receiver, and R. G. Fleming, General Superintendent, Port Royal Railroad.

J. M. Edwards, Superintendent, Northeastern Railroad of Georgia.

H. R. Mallory, of the Mallory steamship line.

M. Stanton, General Superintendent, Selma, Rome & Dalton Railroad.

E. C. Richardson, Boston & Savannah steamship line.

H. S. Haines, General Superintendent, and C. D. Owens, General Agent, Atlantic & Gulf Railroad.

G. W. Adams, General Superintendent, Macon & Brunswick Railroad.

B. Dunham, General Superintendent, Montgomery & Eufrasia Railroad.

G. J. Foreacre, General Manager, and H. M. Cottingham, General Freight Agent, Atlanta & Charlotte Air Line.

E. W. Cole, President; B. F. Wilson, Director, and George R. Knox, General Freight Agent, Nashville, Chattanooga & St. Louis Railroad.

C. M. McGhee, Vice-President; J. R. Ogden, General Freight Agent, East Tennessee, Virginia & Georgia Railroad.

W. M. Wadley also represented the Savannah, Griffin & North Alabama Railroad, the Ocean Steamship Company, and the Philadelphia & Savannah Steamship Company.

Judge J. F. King also represented the Atlanta & West Point Railroad.

The President stated the reason for calling the convention

and made some remarks, in which he submitted the following propositions:

1. The appointment of an agent to travel and examine a books, etc., of the various companies, to verify reports made to the General Commissioner.

2. Only duly authorized representatives to be entitled to seats in conventions.

3. The appointment of a general agent for all lines at each competitive point and the abolition of all soliciting agencies.

4. The status of contracts—they should be charged in the pool at full rates.

5. Regulation of rates; the appointment of a committee report rates for adoption by the convention.

Col. E. W. Cole then presented resolutions passed by the directors of the Georgia Railroad Company, appointing a committee to confer with others on the question of maintaining reasonable rates. Col. Cole spoke at some length on the subject.

On motion, the Atlanta & Charlotte Air Line was admitted as a member of the association.

Mr. C. M. McGhee made a statement contradicting certain reports about the East Tennessee, Virginia & Georgia Company and pledging its earnest support of the association.

On motion of Col. Cole the suggestions made by the President were referred to a committee consisting of Messrs. E. W. Cole, Chairman; W. G. Raoul, John P. King, R. T. Wilson, A. Pope, G. J. Foreacre, D. C. Wilson, G. W. Adams, H. S. Haines, E. P. Alexander, Wm. McRae, M. Stanton, B. Dunham and W. J. Magrath, the General Commissioner being requested to confer with the committee. The convention then adjourned to the next day.

On the following day the committee reported as follows:

Upon the suggestion that only authorized representatives shall sit in convention the committee are of opinion that paragraphs 6, 7 and 8 of the agreement in force Jan. 1, 1877, fully cover the question. In reference to the other suggestions the committee recommend as follows:

That the clause of the report adopted at New York reading "The General Commissioner shall appoint, subject to the approval of the lines terminating at Boston, Providence, New York, Philadelphia and Baltimore, one Deputy Commissioner to supervise all through business at those points, with his headquarters in New York," be amended to read:

"The Association shall elect an Eastern Commissioner, with headquarters in New York, to supervise and distribute all through business originating at Boston, Providence, New York, Philadelphia and Baltimore, in accordance with agreements as to percentages belonging to the respective members of the Association as indicated through the General Commissioner; and that upon the appointment of the Eastern Commissioner, the respective members of the Association having soliciting offices and agents in any of the aforesaid places shall close the same, so far at least as the territory under the jurisdiction of this body in the South is concerned, and thereafter all the business arising in said cities shall be solicited and distributed by the Eastern Commissioner, who shall have sole power to issue through bills of lading."

Your committee further recommend that the clause in the same report reading "The General Commissioner may also appoint, at any competing point in the South, with the approval of the lines concerned, one general agent to give information, and, if agreed upon, to issue through bills of lading," be amended to read: "The General Commissioner shall appoint at each competitive point in the South, subject to the approval of the initial roads, a general agent to give information and to issue all through bills of lading, and upon the appointment of said general agents, all soliciting agencies shall be abolished at those points."

Your committee recommend the adoption by the Convention of the following resolution:

"Resolved, That it shall be the duty of the General Commissioner to appoint an agent to examine the books of all the companies reporting business to this Association, to ascertain if they tally with the reports of business made to the General Commissioner's office."

In reference to contracts your committee recommend, "That all contracts be abrogated, or that the business be charged in the pool at rates that may be established at this Convention."

Your committee further recommend that the matter of rates be referred to a special committee, to whom shall also be referred all existing contracts.

This report being taken up by sections, the first was adopted; the second, relating to the Eastern Commissioner, was laid on the table indefinitely; the third and fourth adopted; the fifth, relating to contracts, laid on the table, and the sixth and last adopted. The Committee on Rates was then appointed as follows: Wm. McRae, R. T. Wilson, J. Foreacre, E. P. Alexander and E. W. Cole.

The following resolution was then adopted:

"Resolved, That Virgil Powers commands the full confidence of this Convention as General Commissioner of the Southern Railway & Steamship Association."

At the evening session the committee on rates presented a report which was considered by sections. The first section presented a schedule of merchandise rates which was not adopted, the rates of Circular Letter No. 68 being substituted by a vote of 23 to 2. The second section recommended the restoration of the cotton rates of Circular Letter No. 68, and was adopted. The third section recommended the abrogation of all contracts where possible, and if not possible, that the business be charged in the pool at the rates adopted by the convention; this was adopted. The fourth section recommended the re-adoption of the Augusta resolution requiring the pooling of all cotton shipped from interior competitive points, and it was adopted. The fifth and last section recommended that in all cases the 20 per cent. "General Commissioner deposit" be reported in full and deposited as agreed without deducting arbitraries, under penalty of a suspension of all relations and connections with the defaulting company. This also was adopted.

It was resolved that the new rates take effect March 18.

Resolutions were then presented and passed authorizing the appointment by the General Commissioner, with the approval of the President, of a General Agent, with headquarters in New York, to supervise all through business from Eastern cities, and perform such other duties as may be assigned to him.

The Convention then adjourned.

Putting off a Passenger Between Stations.

In the case of *Eagleton* against the Nashville, Chattanooga & St. Louis Company in the Tennessee Circuit Court, it appeared that the plaintiff had been on a train on the defendant's road drunk and had refused to pay his fare. The conductor put him off, and he was subsequently found lying by the road with his leg broken. He could give no account of the accident, but it was thought that he had tried to get upon the train again and had fallen and thus hurt himself. The Judge charged the jury: 1. That it was the duty of the conductor to put Eagleton off at a station, and that he had no authority to put him off between stations.

2. That the conductor should have put him off at a safe place, so as not to endanger his safety.

3. That, as Eagleton was drunk and excited, the conductor ought to have been more careful, it being in the night and very dark, in selecting a suitable and safe place to put him off.

The jury brought in a verdict for \$9,000 damages.



Published Every Friday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN OPINIONS, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particularly as to the business of railroads, and suggestions as to all DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

STEEL BOILERS.

II.

In the reports, of which our article of last week was largely an abstract, some interesting experiments are described which were made to determine the resistance of steel to percussion or sudden shocks. These were made in one case "by allowing a steam hammer weighing 25 tons to drop through a height of 2 ft. on a ball 8 in. in diameter, standing in the unsupported middle of the plate. The steel stood the test each time without showing symptoms of cracking, whereas the iron plate broke." Another percussion test was made "by allowing a ball 30 cwt. to fall on the unsupported middle of the steel and iron plates, from distances varying from 5 ft. 6 in. to 12 ft. high. The first blow from a height of 5 ft. 6 in. cracked the iron plate, and these cracks were much extended when the plate was turned up and struck on the other side from a height of 8 ft. With the steel plate the first blow was from 5 ft. 6 in. high; this produced no flaw. The plate was then turned up and struck from a height of 8 ft. 6 in.; it was then turned over again and struck from a height of 10 ft., and was again turned over and struck from a height of 12 ft., and still no crack or flaw was found in it." The iron boiler plates which were tested against the steel plates were said to be in each case of a superior quality.

Tests were also made to determine the relative stiffness of steel and iron plates. In one case $\frac{1}{8}$ in. steel was found to be equal in stiffness to $\frac{1}{4}$ in. iron, and in another experiment $\frac{1}{8}$ in. steel was equal to $\frac{1}{4}$ in. iron.

The resistance to percussion and the stiffness of steel are important qualities when it is employed in the construction of such parts of cars or engines as are exposed to sudden shocks, and the above experiments indicate that in this respect steel of the proper quality is not, as has often been supposed, inferior, but is, in fact, much superior to iron.

With reference to the best method of constructing riveted joints with steel plates, there is no information in either of the two reports which is at all satisfactory. It is announced, however, that a series of experiments on the strength of steel plates and riveted joints is being instituted by Lloyds, a report of which will probably soon be published. It may fairly be expected that these will do something to clear up the fog which exists in relation to this subject now. Any one who studies the literature of it will soon learn that it is of the most contradictory character. One experiment will prove in the most conclusive way that punching diminishes the strength of a plate 30 per cent., whereas the results of the investigation of another will show that it is a matter of indifference whether the plates are drilled or punched. Thus in an editorial article in the *Engineer* of Feb. 15 it is said that in "a paper read by Mr. Sharp before the Institution of Naval Architects in 1868 the author gave as the result of his experience a loss of 33 per cent." from punching. Mr. Kirk, in a paper read before the same body in 1877, gave similar figures. Mr. Webb, of Crewe, states that the loss of strength is but 26 per cent. The investigations of Mr. Parker fully confirm the teachings of past experience, and a material which is apparently almost as ductile and 'kind' as lead, no doubt loses about one-third of its strength when punched." On the other hand, experiments made by Mr. Cochran and published in vol. XXX. of the Transactions of the Institute of Civil Engineers, showed "that in a case of a variety of irons, the strength was the same whether the holes were drilled, punched first and cleaned out by a drill, or simply punched." Mr. J. J. Smith in vol. XLII. of the Institute says: "Experiments have demonstrated that the zone of metal injured by punching steel having a tensile strength of not more than 32 tons is not more than $\frac{1}{8}$ in. in breadth, and that if the fish-plate holes (he is speaking of steel rails) are first made with a small punch and then enlarged by drilling to the required size, the steel is not more injured than if the hole had been drilled only." Mr. Kirk says of steel plates, "that when the diameter of the hole is as much as three times the thickness of the plate, the plate may be punched with impunity, and that annealing produces little or no benefit." An account of some experiments made by Messrs. Hoopes & Townsend, of Philadelphia, was published in the *Railroad Gazette* of Nov. 3, 1876. These were made on iron bars and showed that those which were punched were stronger than those which were drilled.

This contradictory testimony leaves the whole subject in a state of doubt. It seems probable, though, that hard steel with a very high tensile strength is materially injured by punching, and it has also been shown that much less injury is done to any material if the die is made with a broad face and with a hole somewhat larger than the punch. Whether the soft, ductile boiler plates which are now manufactured in this country and Europe are injured by punching, if the latter is properly done, must be regarded as a subject which is still in doubt. It has been shown, however, that by annealing plates after they are punched they are restored to nearly if not quite their original strength, and therefore with the present knowledge of the subject it is evident that the safest course to pursue is either to drill the plates, or, if they are punched, to anneal them afterward.

The committee who reported on steel for boiler making are very decided in recommending the use of steel rivets, although it seems on somewhat insufficient ground. Doubtless the whole subject will be more thoroughly investigated in the experiments which have already been referred to. Reference is made to the fact that in experiments made on the tensile strength of steel "the specimens failed by crippling behind the pins" and that in tests of riveted seams the opening of the joints at a comparatively low stress seemed to be due to the same cause. The deduction is therefore drawn that probably a greater bearing surface of the rivets is required with steel than with iron plates. This cause will probably lead to a very material change in the proportions and arrangement of the holes and rivets to the plates, and a modification of existing practice. Before any reliable conclusions can be drawn with reference to this, more precise experimental knowledge is needed, which it is hoped the experiments now in progress will give.

A test was also reported which was made with flat plates of steel stayed in the manner usual in combustion chambers, but with a reduction of 12 per cent. in thickness as compared with iron, which showed that the steel "had the same ultimate strength to resist buckling, but the deflection was much greater, and permanent set takes place earlier in steel than in iron." This would indicate that if thinner steel plates are used under such circumstances, which are sim-

ilar to those existing in the fire-boxes of locomotives, the stay bolts should be placed closer together. It is probably owing to the greater ductility of steel that what is called "bulging" between the stays, which often produces needless alarm, is more likely to occur with that material than with iron, if the stays are not placed near enough together. Although this bulging does not weaken the plates, yet with a very ductile material it may occur to such an extent as to stretch the stay-bolt holes so as to allow the threads to strike, which is of course attended with very great danger.

This result and also the fact that a very soft steel does not offer sufficient resistance to rivets, but is crushed or crippled under strain, indicates that there is danger of steel being too soft, and that while it is desirable to avoid the great risk of failure from cracking, at the same time there are other dangers incurred by the opposite qualities.

A very important question with reference to steel boiler plates is their power of resistance to corrosion. With reference to this the committee say that "the experience of some years, however, will be needed to decide this point." Two cases only are reported of iron and steel boilers in use under precisely the same conditions, both of them on steamboats. In the one case it is said that the "boilers are in good condition, with the exception of some parts of the uptakes and sides near them; at these parts in both the iron and the steel boilers corrosion appears to be going on rapidly, and to a slightly greater degree in the steel boiler than in the iron one." In the second boat the boilers were constructed about ten years ago, but have been in use only about six years. Of these it is said: "As was to be expected from the age of these boilers, they are both considerably worn, but the deterioration caused by corrosion is much greater in the steel boiler than in the iron one; and especially is this so in the uptake, the back plates of the combustion chambers, furnaces, and other parts subject to the action of the heat. A very noticeable feature in the condition of these two boilers is that while the corrosion in the iron one is pretty equally distributed over all the boiler, in the steel one there is a great want of uniformity in the effects upon the different plates, some of these plates being apparently almost corroded through, and others by the side of them being in as perfect condition—so far as regards corrosion—as when they first left the rolls."

Both of the committees recommend that when steel is used instead of iron, a reduction of the thickness of plates be permitted, in ships of 20 per cent., in the shell plates and stays of boilers of 25 per cent. and in the flat plates not subject to the action of heat to the extent of 12 per cent.

The portions of the report which are immediately applicable to locomotive practice are the following proposed tests for steel plates:

"1. The material to have an ultimate tensile strength of not less than 26 tons [58,240 lbs.] and not more than 30 tons [67,400 lbs.] per square inch of section, and that a piece 8 in. long shall elongate 20 per cent. before breaking when subject to tensile stress.

"2. A strip cut from every plate used in the construction of the furnaces and combustion chambers, and strips cut from other plates taken indiscriminately, heated uniformly to a low cherry-red heat, and quenched in water of 82 degrees Fahrenheit, must stand bending to a curve, of which the inner radius is not greater than one and a half times the thickness of the plates tested.

"3. All the holes to be drilled, or, if they be punched, the plates to be afterward annealed.

"4. All plates, except those that are in compression, that are dished or flanged, or in any way worked in the fire to be annealed after the operations are completed.

"5. The boilers, when completed, to be tested to not less than twice the intended working pressure."

It was also proposed by one of the committees that every plate from which a piece has been cut and has successfully resisted the above tests should be stamped with a suitable brand.

Altogether these two reports are the most valuable contributions that have thus far been made to the literature of this subject. It is to be regretted that in such researches we are wholly dependent upon European investigations. There is probably no work which the Master Mechanics' Association could do to more advantage than to adopt some tests similar to those given above, with the recommendation that all manufacturers should stamp plates which have stood these tests successfully with some suitable device.

What is very much needed, though, is some thorough investigation of the strength of riveted joints made of steel plates and with steel rivets, and also of the strength of flat stayed surfaces. The difficulty of having reliable experiments made is very great, much greater than those who have never given the subject much attention have any idea of; yet it would seem as though the subject referred to was one in the investigation of which it might be wise to expend a portion at least of the income of the fund which the Association referred to now holds, and

which, if allowed to accumulate indefinitely, will be certain ultimately to become a bone of contention.

That in future steel will be almost exclusively used for the construction of boilers now hardly admits of a doubt, and therefore it is important to possess the most reliable and complete information relating thereto. This work naturally seems to fall to the lot of the Master Mechanics' Association, which has, it is true, already done much, but the observation and experience of its members needs to be supplemented by some experimental investigations to clear up doubtful points.

ATLANTIC GRAIN RECEIPTS IN 1877.

A little more than a year ago we published the results of a special investigation of the course of the grain traffic for a series of years, including the movement the interior to the seaboard, the exports from the seaboard, and the receipts by different routes at New York. This traffic had a special interest then, not only because of its amount and growth—and it is the largest single branch of traffic in America and a growing one—but also because of the new factors which were effecting its transportation. These latter consisted in the completion of new routes which enabled Baltimore to compete more effectively for a share of the traffic, but chiefly in the very great reduction in rail rates, which in 1876 went so far as to deprive the water route of the advantage of superior cheapness. This latter enabled the cities which do not receive by water to compete for the grain traffic on nearly equal terms with New York and Montreal, which receive by the Erie Canal and the St. Lawrence River. To trace the effect of these new factors, which became fully operative only in 1876, was the chief object of the discussion last year.

The circumstances in 1877 were materially changed. It is true that contracts were outstanding by which, during the first half of the year, the grain could be carried east by rail at the excessively low rates of 1876. But the crop of 1876 had been light, and the low rail and water rates had encouraged its rapid marketing. Considering the amount of the crop, the winter movement to the seaboard in 1877 was large; but the whole movement of the old crop was so light as to prevent any notable diversion of business. Before the new crop, which was doubtless the largest ever produced, began to come forward, rail rates had been advanced to the basis of 30 cents per 100 lbs. from Chicago to New York, which was 50 per cent., and more, higher than the prevailing rates for three-fourths of the year 1876, and so high as to leave a considerable margin in favor of the water route. That is, for half of the year, and that the half in which nearly three-fourths of the grain came forward, the conditions under which the grain moved were the old, familiar ones, except that the improved Baltimore connections remained. The water routes were the cheapest routes, and the termini of these routes had an advantage over the markets which receive only by rail, not of the same amount as formerly, but still a material advantage.

It is important to know the effect of this changed condition of things. Naturally one would expect that the termini of the water routes would tend to recover the position which they lost when the low rail rates of 1876 put Philadelphia and Baltimore on a level with New York.

The recent report of the New York Produce Exchange, containing the elaborate statistics collected by Mr. E. H. Walker, the Statistician of the Exchange (to whose wide knowledge and indefatigable industry it is due that we have any adequate materials for the study of the subject), supplies us with the figures for the grain traffic of 1877, which we have utilized for a continuation of the graphical statistics which we first presented last year.

We give the receipts for the five ports of Montreal, Boston, New York, Philadelphia and Baltimore, omitting two of the Atlantic ports, Portland and New Orleans, which are usually included in tables. But aside from the fact that heretofore the competition of these places for the grain trade has been unimportant we encounter the farther difficulty that amounts exported by these ports heretofore have hardly been large enough to be represented on diagrams of so small a scale as ours, and it is only the exporting ports which exercise any considerable competition for the business. Heretofore the receipts of New Orleans have been chiefly for local supply and distribution; and Portland's receipts and exports are both insignificant.

The quantities here given include grains of all kinds, and flour and meal reduced to bushels at the conventional rate of five bushels of wheat to one barrel of flour. The bushel is not the proper unit of comparison for the carriers, who are concerned with the produce only as freight, but it is the one most useful to the merchant, and we have not undertaken to reduce the bushels of 32, 48, 56 and 60 lbs., and barrels of 196

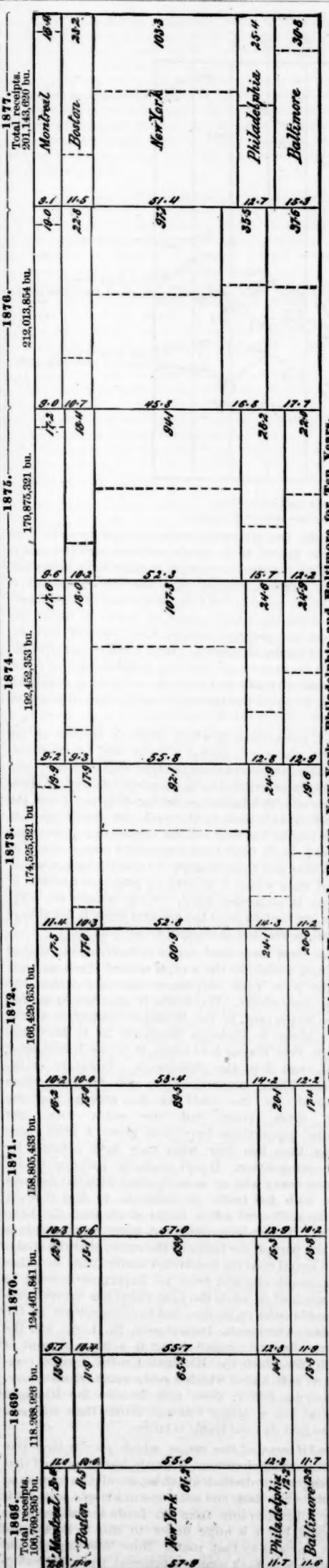


Diagram 1.—Grain Receipts at Montreal, Boston, New York, Philadelphia and Baltimore for Ten Years. The figures to the left of each small rectangle indicate the quantity in millions of bushels. The figures to the right of each small rectangle indicate the percentage of the total receipts represented by that rectangle. The portions of the rectangles to the left of the dotted lines are represented by the portions of the rectangles to the left of the dotted lines.

lbs., to tons, which would make the clearest showing of the importance of the business to those engaged in transportation. About two-thirds of the whole, in 1877, was wheat and corn, and about one-fifth flour and meal reduced to bushels, and that year, a reduction of receipts at the seven Atlantic ports shows this average number of bushels of grain of all kinds and of reduced bushels to be about 40 per ton of 2,000 lbs. The business of the five ports, according to this, amounted to just about 5,000,000 tons, or half a million car-loads—equivalent to a delivery of 1,370 car-loads daily at the seaboard.

No account is here taken of the grain movement of our Pacific coast, which is often very large, and in the article of wheat has once furnished more for export than all the rest of the country. It does not, however, affect in the least degree the movement of the grain on this coast, except as it affects the foreign demand. To include it would be only to obscure the discussion, especially as the business of that coast fluctuates greatly.

And before going further, it will be well to make it clear that though the competition of markets is almost entirely and the competition of routes is chiefly for the grain exports, and this traffic is a very large one, it is after all but a small part of the whole grain movement of the country, and but a very small part of its total grain production. On the average the exports of the past five years have amounted to just about 7 per cent. of the total production as reported by the Agricultural Department, and the exports are not more than half of the total receipts of the seaboard ports alone, the receipts of those ports being but a fraction of the whole quantity marketed. It is well to understand, then, that in these discussions we by no means develop the whole importance of the grain business, nor even of the transportation of grain, but only of that part of the traffic which within certain limits may be diverted from one market or carrier to another.

Beginning now with the receipts of Montreal, Boston, New York, Philadelphia and Baltimore, we have represented these both in millions of bushels for the past ten years in Diagram 1. In this diagram the receipts of each year are represented by rectangles of equal height, but varying in width in proportion to the number of bushels received. Thus the rectangle for 1876, when 212,000,000 bushels were received, is twice as wide as the rectangle for 1878, when 106,000,000 bushels were received in the aggregate at the five ports. Each of the rectangles for a year is divided into five smaller rectangles, one for the receipts of each port. These rectangles are of equal width, but vary in perpendicular height according to the percentage of the total receipts of the year received. In this way the area of each rectangle is exactly in proportion to the number of bushels represented by it.

Last year our diagram included the two years 1866 and 1867, which have been omitted here to make room for 1877.

The names of the markets are given in the extreme right and left years. They are in the same order in the other years, namely, Montreal, Boston, New York, Philadelphia and Baltimore, reading from the top down. The figures to the left of each small parallelogram represent the percentage of the total receipts that arrived at the place represented by that parallelogram; the figures to the right, the quantity in millions of bushels. Thus in the upper division of the rectangle representing the receipts of 1877 we have:

1877 Montreal 18.4.

This shows that the receipts of Montreal were 9.1 per cent. of the aggregate receipts of the five ports and amounted to 18,400,000 bushels. The aggregate receipts of the five ports for each year are given in figures above the rectangle for the year.

The portions of the rectangles to the left of the dotted lines (shown for five years only) represent the amounts exported.

An inspection of this diagram shows at a glance the variations in the proportions received at the different ports. The variation in amounts is not so readily distinguishable in this figure, and for that reason is shown in another (Diagram 2), in a manner familiar to most readers.

The two northern ports are seen to have maintained a very equable position in receipts. Their receipts have varied greatly in amount, but the proportions have been singularly uniform for twelve years. Their receipts, apparently, increase and decrease as the total movement increases and decreases.

With the other three ports it is different. The marked feature of the diagram is the almost uninterrupted increase in the height occupied (and in proportions of business indicated thereby) by Baltimore and Philadelphia until 1877. The two northern ports holding their own, this increase was wholly at the expense

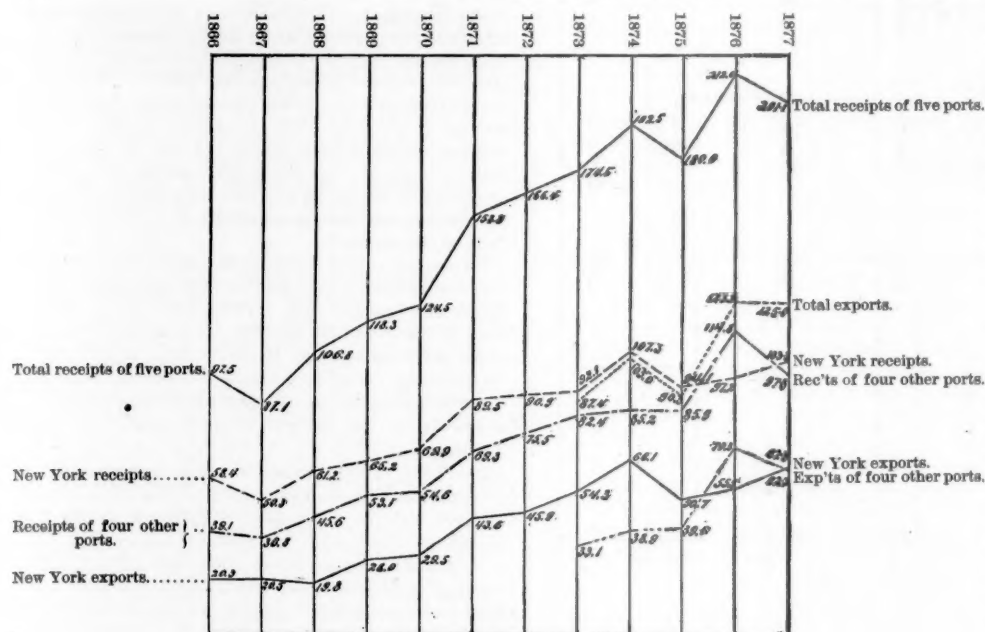


Diagram 2. Course of Grain Receipts and Exports for Twelve Years. [The figures at the intersections of lines indicate millions of bushels.]

of New York, whose proportion fell from 57.9 per cent. in 1868 to 45.8 in 1876. The last year, however, shows a decided arrest and reversal of this movement. New York's proportion increased from 45.8 to 51.4 per cent., and Philadelphia and Baltimore together received 28 per cent. in 1877 against 34.5 per cent. in 1876, falling back to almost exactly the position occupied by them in 1875.

Below we give the percentage of the total receipts of the five ports received at each port for twelve years. The figures are the same as those on the left hand sides of the rectangles:

	Montreal.	Boston.	New York.	Philadelphia.	Baltimore.	All but New York.
1866.....	10.9	11.6	61.2	7.7	8.6	38.8
1867.....	10.3	12.5	55.3	8.8	13.1	44.7
1868.....	7.8	11.0	57.9	11.7	11.6	42.1
1869.....	11.0	10.0	55.0	12.3	11.7	45.0
1870.....	9.7	10.4	55.7	12.3	11.9	44.3
1871.....	10.3	9.6	57.0	12.9	10.2	43.0
1872.....	10.2	10.0	53.4	14.2	12.2	48.6
1873.....	11.4	10.3	52.8	14.3	11.2	47.2
1874.....	9.2	9.3	55.8	12.8	12.9	44.2
1875.....	9.6	10.2	52.3	15.7	12.2	47.7
1876.....	9.0	10.7	45.8	16.8	17.7	54.2
1877.....	9.1	11.5	51.4	12.7	15.3	48.6
Average..	9.8	10.5	54.6	12.7	12.4	45.4

Here the last column is the most interesting, showing, as it does, the progress of the four ports, Montreal, Boston, Philadelphia and Baltimore, together. A further and perhaps more striking illustration of the progress in total receipts, in New York receipts, and in the receipts of the four other ports, will be found on Diagram 3, which is of a form commonly employed, and hardly needs any explanation. The points of intersection with the perpendicular lines for each year represent the quantities received, and the figures at these intersections stand for millions of bushels.

The East Bound Apportionment.

The meeting at Chicago was more harmonious than many dared hope it to be. The disposition shown was altogether encouraging, and hardly left any doubt that there was a strong desire to make the plan for dividing traffic and maintaining rates, as adopted at the New York meeting of March 7, practical and effective. It was particularly encouraging to see that in many cases the roads of themselves agreed upon the apportionment of tonnage among them, as was the case at St. Louis; and in cases where the apportionment was finally left to the arbitration of the Commissioners, not only did the companies accept it, but apparently they were entirely satisfied with it. Apparently provision will be made for everything except the Milwaukee shipments; and the companies interested in these not only agree to maintain rates but to make returns of the amounts of their business, precisely as if the business was to be divided. This is of very great value, because through the returns it can be known almost immediately whether any competitor is using any illegitimate means to increase its business, and in course of time the statistics so obtained form invaluable material for the foundation of future agreements and a defense against future troubles, even if no apportionment is made. How utterly absurd and ineffective to secure the objects aimed at most railroad wars have been becomes strikingly evident when we are able to trace the history of the traffic before, during and after the

struggle. One gives rebates which do not for a few days become known to its rivals, and this one's proportion of traffic perhaps increases materially for a little; the others follow in cutting rates and the old balance is just about restored; so that, in the end, each road gets just about the same amount of traffic as before the contest had perhaps reduced rates one-half and destroyed profits altogether. With a full record of traffic it will be easy to see that the possible gain of a few per cent. of traffic in a reckless competition could not begin to equal the inevitable loss by the reduction of rates.

The proportions in which traffic is divided at the several places will attract a great deal of attention. Probably few except those familiar with the local traffic of the places will fail to be surprised by some of these divisions, which in no case are far different from the proportions obtained by the roads for some time past, according to the best returns obtainable. Circuitous routes in some cases have secured the largest share of the traffic, and there seems to be a virtue in long established lines which it is hard to overcome: which, of course, is altogether right, for why should we withdraw our custom from the old firm when it has always served us well and as cheaply as any one will?

The most important traffic to be divided is that of Chicago, which, by the way, is several times as great as the New York shipments westward which the trunk lines divide. This traffic is apportioned as follows: 32 per cent. to the Michigan Central, 27 to the Lake Shore & Michigan Southern, 24 to the Pittsburgh, Fort Wayne & Chicago, 10 to the Baltimore & Ohio, and 7 to the Pittsburgh, Cincinnati & St. Louis. These proportions are not far from those obtained by the roads on the average for the past three years, but the roads with the smaller proportions have been given a little more rather than less than what they have obtained by free competition. It will probably surprise many, at least many who are more familiar with the finances than with the traffic of railroads, to find that the Michigan Central has a larger share than the Lake Shore. It must be remembered, however, that this is but one part of the traffic of the roads; that the Michigan Central receives east-bound traffic from no other considerable city and from no important railroad to the south of it, while the Lake Shore has several considerable cities on its line, and has connections to Columbus, Cincinnati, Indianapolis, St. Louis and the country beyond, which bring it a large amount of traffic, for which the Michigan Central cannot compete so well, and of which it gets a much smaller share. It does not follow, then, that because the Michigan Central has a larger Chicago traffic than the Lake Shore that its total traffic is larger.

And if some of the routes which receive large proportions seem circuitous, it should be remembered that the shipments divided are those to all the competing points in the East, and not those to a single port. It is very indirect to ship from St. Louis to Baltimore via Chicago, but it is quite direct to ship to Boston and New England by that route. Now New England and Central New York receive a material part of the shipments, and it must not be left out of the account in judging of the natural course of shipments.

Probably the limitation of the time of the apportion-

ment to three months had a good effect in inclining companies to accept without much hesitation the proportions awarded them. None can be seriously hurt in three months; and for that time it will know absolutely how much freight has been offered to each line, and whether it varies materially from the proportion allotted. If then the distribution appears unequal or unfair, there will be an opportunity to insist on a change. And then, too, if the apportionment shall be found advantageous, as there can hardly be any doubt that it will be if it is carried out, there will be an opportunity to renew it and extend it and perfect it and make it permanent. April, May and June this year will all be included in the season of navigation. Necessarily the most important articles of freight will have to be carried at low rates. The competition of the lakes will bring prices down so low that there will probably be not much inclination to force them still further down by a competition among the railroads. The circumstances seem generally favorable to a fair trial of the plan. It remains true, however, that the agreement covers very complex and varied interests, and that the action of one of the many parties to it may prevent its success. In matters of this kind it is necessary to a great extent to feel the way—not to attempt to provide for everything at once, but to settle difficulties as they arise, and allow for the development of the plan to fit the circumstances of the case.

Railroad Construction in Australia.

At the close of 1876 there were 293 miles of steam railroad and 46 of horse railroad belonging to the government in South Australia, and 32 miles of private railroad, which was equivalent to one mile of railroad to 608 inhabitants.

On the 16th of January, 1877, the last 27½ miles of the Kingston & Narracoort Railroad was opened, making it 52½ miles long. It is of 3 ft. 6 in. gauge and cost \$17,625 per mile. It has been prophesied of it that "it would never pay the grease for the wheels."

During the year 512 miles more were under construction in this colony, for which Parliament had voted the capital. A contract for over 197 miles was let to D. M. Barry & Co., of Melbourne, at \$14,805 per mile, exclusive of station buildings, rails and rolling stock; it was not begun until Dec. 20 last. For another, 50 miles long, a contract was let to E. & E. Miller, of Victoria, at \$8,445 per mile. During the year 1877 the Parliament of the colony approved the construction of one road 23½ miles long at \$21,250 per mile; of one 6½ miles long at \$28,450 per mile; and of one 6½ miles long \$29,450 per mile. All are of 3 ft. 6 in. gauge.

In the same year a number of corporations were chartered to build street railroads, one of which is to be worked by steam.

For the year ending with June, 1877, the earnings of the South Australian Government roads, which were 366½ miles long at the close of the year and averaged something like 330 miles, were at the rate of \$2,800 per mile; and the total, notwithstanding an increase in mileage, was 17 per cent. less than for the year preceding. The total net earnings were \$54,500, while the capital invested in the roads was about \$7,500,000.

The colony of Victoria at the end of 1876 had 719 miles of railroad completed and 259 under way. At the end of June, 1877, it had 803 miles in operation, against 618 a year before. There was at the later date a mile of railroad to 1,197 inhabitants. In the course of 1877 there were six lines and sections of lines opened, respectively 13, 14, 47, 17, 34 and 19 miles—144 miles in all, bringing up the total at the end of 1877 to 863 miles.

The Victorian Parliament last September voted the construction of seven new roads, which will have a total length of 102 miles.

The gross earnings of the roads of this colony for the year ending with June, 1877, were \$5,390,410 from an average of about 730 miles of road, making the average per mile \$7,600, which is a thousand dollars more than the average of American roads. The net earnings of the Victorian roads that year were equivalent to 4½ per cent. on their cost. One of the companies paid 15 per cent. dividends.

The colony of New South Wales at the end of 1876 had 509 miles of railroad in operation and 179½ under construction, and had expended \$42,853,300 on their account. There were then 1,137 inhabitants to each mile of railroad. The net earnings of the year were about 4 per cent. on the capital invested. In 1877 three new lines or parts of lines were opened, each 20 miles long. One road in this colony is now 253 miles long and another 192. Parliament in 1877 decided in favor of the construction of five new lines or extensions which will have a total length of 532 miles.

In Queensland, at the close of 1876, there were 298 miles of railroad in operation and 216 under construction. On one road 75 miles were opened in 1877, and on another 120 of track was laid, but not opened for business. Five more roads were authorized by Parliament during the year, which will have a total length of about 160 miles.

The colony of West Australia had 38 miles of railroad both at the beginning and at the end of 1876. Seventeen miles more were opened in 1877.

Tasmania (formerly Van Diemen's Land) had 172½ miles at the close of 1876, or a mile to 590 inhabitants, and more under construction.

New Zealand has made more rapid progress than any of

the other colonies. There were 542 miles open at the end of 1875, and 718 a year later, when also 427 miles were under construction and 163 under survey. The railroad completed was at the rate of one mile to 556 white inhabitants. The colony has incurred an enormous debt for its railroads—at the end of June last more than \$100,000,000, or \$250 per head of population. At the same rate a debt in the United States would amount to more than \$11,000,000,000—five times our national debt.

In the seven Australian colonies, then, there were at the beginning of 1877 2,825½ miles of railroad opened for traffic, an average of one mile to 855 inhabitants, and 1,628½ miles had been begun. The total mileage for this immense territory, which is nearly as large as Europe, was a little more than that of the State of Wisconsin and a little less than that of the State of Missouri. The interest that is felt in it, however, is due rather to what is to be done than to what has already been done. It is true that, considering the population, rapid progress is made there in construction at a time when dullness reigns almost everywhere else. But the 1,629 miles which were to be built at the beginning of 1877 were not all to be built that year. In 1876, when railroad construction was considered active, only 318 miles of road was completed, and the resources of the colony are so limited that the construction of any one year can never be expected to reach what would be called large figures in this country. It must be remembered that the larger part of Australia is not only uninhabited but nearly uninhabitable, being quite barren from want of water. There is, however, still an immense area of land fit for agriculture or pasture, and New Zealand is nearly all fertile and well watered and wooded.

The Union Pacific and the Kansas Pacific.

The Pacific pro-rating bill which has been favorably reported by the Home Committee on Pacific Railroads is intended to give effect to the original provisions of the laws concerning the co-operation of the Union Pacific and the Kansas Pacific roads, these laws having provided that the several branches of the Union Pacific, namely, the "Union Pacific, Eastern Division" (now Kansas Pacific), the "Union Pacific, Southern Branch" (now Kansas Line of the Missouri, Kansas & Texas), the "Central Branch, Union Pacific" (Atchison westward), and the "Sioux City & Pacific"—that these several "branches" should be operated in connection with the main line "as one continuous line, without discrimination." The committee apparently recognizes the unsuitability of a body like Congress to settle questions of this kind, and therefore propose to establish a commission of experts as a sort of special court to determine the questions arising between the companies. This is, perhaps, the wisest thing to do if there are any questions to settle. The justice of requiring the Union Pacific to pro-rate with the Kansas Pacific depends altogether on the provisions of the law under which the two roads were constructed and subsidized. No road should be compelled to share its traffic with another without consideration. And the provisions of the original law, which seem clearly to require such a pro-rating, will not alone suffice. By that law, the Union Pacific, Eastern Division, now Kansas Pacific, was to make a junction with the Union Pacific at the 100th meridian, which is 250 miles east of the point where the junction was finally made, at Cheyenne. If the original act was a contract between the Union Pacific and the Government, then what the road agreed to with respect to the Kansas Pacific was that it would exchange traffic on which it would have a haul of 780 miles, between the 100th meridian and the western terminus beyond Ogden. This is a different thing, and something more favorable to the Union Pacific, than an exchange of traffic on which it gets a haul of 525 miles, between Cheyenne and the western terminus, which was not contemplated by the original bill. And, for the same reason, the fact that the Kansas Pacific was secured a right to pro-rate with the Union Pacific from a junction at the 100th meridian does not necessarily give it a right to pro-rate at any junction point. The truth is, we believe, that the route of the Kansas Pacific was changed at the instance of its promoters, who were making money by its construction and desired to make it as long as possible and get the government subsidy therefor, probably not caring much about the ultimate value of the road.

It is true that the right to pro-rate may have been secured when the route was changed; but it evidently does not follow from the original grant. The interpretation of the Union Pacific charter by the Senate Judiciary Committee, however, would seem to give Congress the power to require of that and the other subsidized Pacific railroads any conditions which it may think reasonable; the best lawyers in the Senate support this position, and if it is held good the question of requiring a pro-rating at Cheyenne will be wholly one of expediency and justice, in view of all the facts, and to decide it it would be necessary to know all the circumstances affecting the change of location of the Kansas Pacific.

The fact is, that at the time these roads were built very little attention was given to their future operation. The companies, or the contractors who dictated their management, were pretty fully absorbed in efforts to make as much money as possible out of their construction, and it is doubtful if they knew or cared much about the relations which the roads would have to each other after they were completed. The effect of a negotiation for the interchange of traffic at Cheyenne would be substantially to take from the Union Pacific the profit for half of the haul on that share of the traffic which the Kansas Pacific might secure. How much that would be is, of course, uncertain. The St. Louis roads, and the Kansas Pacific itself, would be the lines

chiefly interested in cultivating traffic in this direction. The fact that the line passes through Colorado and Denver, would attract a good many passengers, but it would probably be more difficult to divert the freight traffic, for the greater part of which the present route as the most favorable. On the whole, doubtless, the effect would be decidedly injurious to the Union Pacific and decidedly advantageous for the Kansas Pacific. The only other "branch" which makes a connection with the Union Pacific is the Sioux City & Pacific, which certainly will never do the Union Pacific any harm.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new roads as follows:

Missouri & Western.—The *Joplin Branch* is completed from Oronogo, Mo., to Joplin, 8 miles.

Cincinnati & Eastern.—Track is laid on the *New Richmond Branch* from Batavia, O., south by west to Tobasco, 7 miles. It is of 3 ft. gauge.

Natchez, Jackson & Columbus.—Extended from Fayette, Miss., east by north to Red Lick, 8½ miles. It is of 3 ft. 6 in. gauge.

Holly Springs, Brownsville & Ohio.—The first track is laid from Brownsville, Tenn., northward 10 miles. It is of 3 ft. gauge.

Kansas City, Burlington & Santa Fe.—Extended southwest nineteen miles to Burlington, Kansas.

This is a total of 52½ miles of new railroad, making 225½ miles completed in the United States in 1878, against 164½ miles reported for the corresponding period in 1877.

THE "BELT LINE" in New York is a street railroad that extends along the docks for some three miles on the North River on the west side of the city and for four miles or more along the East River docks on the east side of the city. About two and a half miles on the west side and a mile on the east side are a little inland, and at Fifty-ninth street 5½ miles north of the southern-most point of the island, it crosses the island from east to west, just south of Central Park, thus forming a continuous line around that part of the city below the Park. Most of the docks of the city abut on the streets through which this road runs, which thus forms substantially a marginal railroad. It does not serve to connect railroads, however, because there are but two lines which actually enter the city, but it runs quite close to most of the heavy business of the city. It is thus well situated as a city freight railroad, as it approaches nearly all the docks, and can receive cars from any of the railroads, including those which have their termini in Jersey City and Brooklyn, but transfer cars to stations on the New York side. The streets through which it runs are very much crowded by carts in the day, but long ago effort was made to permit freight cars to be moved over it by night. Last year an application to that effect made by the New York Central Railroad was rejected; this year, when the trouble about Boston rates arose, the Chamber of Commerce Committee reported the inadequacy of terminal facilities to be one of the chief causes of the great cost of doing business in New York, and recommended especially that the Belt Railroad be utilized for transferring freight. An earnest effort was made by the merchants to secure this, and finally the Common Council granted the privilege, by a vote on last Tuesday. All railroads are to have the right to have their freight cars drawn on this road by inclosed steam dummies in trains of not more than ten cars between 7 p. m. and 4:30 a. m. from the middle of April to the middle of September, and between 6 p. m. and 5:30 a. m. for the other seven months of the year. Permission is also given to lay tracks upon piers and into warehouses on the rivers.

This may be made of very great assistance in the collection and distribution of freight in the city. Whether it will be or not remains to be seen.

THE PACIFIC RAILROAD COMMISSIONERS named in the bill which the House Committee on Railroads has agreed to report to adjust the terms of the interchange of traffic between the Union Pacific and the Kansas Pacific are such astonishingly fitting nominations as to justify notice and commendation notwithstanding the fact that the bill is not even reported yet and may not be accepted by Congress, and that if accepted, Congress may name different persons for Commissioners, or may leave their appointment to the President, as is usual in such cases. But we are so accustomed in this country to see positions requiring special knowledge and qualifications given as a matter of course to professional politicians, that a word of commendation is deserved when a committee of Congress proposes three such men Charles Francis Adams, Jr., Albert Fink and Judge Thomas M. Cooley, as Commissioners, to determine questions concerning the relations of two railroad companies under an act of Congress. The first two need no introduction to railroad men. The bill which the committee report requires that one Commissioner shall be "skilled in the law," and another "thoroughly acquainted with railroad business," which are just the qualifications required for the British Railway Commission. Judge Cooley is evidently intended as the lawyer of the Commission, and it is hardly possible that an abler or more upright one could have been secured by any means. He is a professor in the law school of the University of Michigan, and the author of several standard legal works, which have brought him a national reputation. So much for the proposed personnel of the Commission. As for the office, it seems rather too big for the work. The Commission would substantially form a court of experts to settle questions arising between two roads, while the British Commission, of the same num-

ber, does similar work for all the railroads of Great Britain, and also hears and decides a considerable range of questions arising between the railroads and the public. But we are so astonished that such nominations could be made, made too, we venture to say, without the knowledge of one of the nominees, that we hardly care to inquire what the office is, what its uses are, or whether it has any.

RAILROAD EDUCATION was the subject of a very interesting lecture delivered last December before the Austrian Railroad Club by Professor Lorenz, Chevalier von Stein. He treated the development of the education obtained in the natural course of things by railroad men and officers, beginning before entering their employment in the preliminary education of the common schools, which is indispensable to any further progress, and even to beginning service in this employment, then extending to the education for the special service of railroads, acquired either in the service or partly in technical schools before entering it and partly afterward, resulting in experience and skill in the several branches of railroad service; but finally culminating in a knowledge of what may be termed the "science of railroading," a grasping of the general principle that underlie the phenomena of railroad business, and which are by no means necessarily familiar to those who have acquired skill and had experience in railroad service, and in fact are not usually comprehended by them until late in their service and by the more thoughtful and observing minds, with some capacity for tracing facts to the general principles that underlie them. On this latter stage of railroad education Professor Stein lays special stress, and believes that it, as well as more of the purely technical education, should be provided for by institutions of learning. This he would have done by adding courses of instruction in existing institutions, and his preparation for railroad service he would distribute in three groups; first, education for the railroad service, including general technical courses, mathematics, mechanics, machinery, construction, book-keeping, etc.; second, training in the general principles of the calling—political economy, statistics, the science of administration, physics; and, third, training for a special branch of railroad business, to be given by courses of lectures on the several special classes of business.

THE AUSTRIAN RAILROAD CLUB, the organization of which less than a year ago we noted at the time, seems to have become at once an active and effective body. We judge of it by the published proceedings, which consist almost entirely of lectures delivered before the Club, of which there seems to be one at every meeting, sometimes by railroad men and sometimes by professional teachers, but in almost every instance on some subject directly concerning and practically affecting railroad business. There has been one recently on the Transportation of Explosives; we translated recently a passage from one by the Imperial Railroad Director von Nördling on Impressions of English Railroads; there have been one or two on American railroads by men who visited this country in 1876; and the very latest of all so far received was delivered Jan. 29 by the engineer Frederick Steiner on "Railroad Accidents and Failures of Bridges in the United States of North America," based on the accident reports which we have published from month to month. The proceedings of this club indicate a high degree of intellectual activity among the railroad men of Austria, and a disposition to make serious studies of questions connected with their business, aside from those actually required by their official duties, such as is quite rare here. It may also indicate that railroad men are not so severely worked in Austria as in this country, where we know that some of the ablest, most cultivated and public-spirited railroad officers, who eagerly desire to advance their profession, find it simply impossible to do more than attend to indispensable daily duties. But it is also true that habit and "the fashion" have a good deal to do with this indisposition of American railroad men to write about their business. It does not now occur to them to do so, as it does naturally to a European in a similar position, and with similar ability.

THE MICHIGAN CENTRAL, after a long interval, again takes a position among dividend-paying roads, a dividend of 2 per cent. having just been declared. The last cash dividend paid by this company was in the last half of 1872, and the following winter a stock dividend of 4 per cent was paid. Before that time, for a great many years, 10 per cent. dividends had been paid regularly, and the stock was regarded as one of the soundest possible of investments, being sometimes something like 140 in the market, and being very largely held by small investors in New England, and especially in Massachusetts. This is one of the roads, however, which depend very largely on through traffic, and the rates on this of late have left little or no margin for profit. The capital stock, too, has been more than doubled since the war, the funded debt trebled, and the company, moreover, has been burdened by large fixed charges for rentals of roads which do not earn as much as they cost. The misfortunes of the road have been very generally ascribed to these rentals of unprofitable branches, but actually, the loss by them is but a small proportion of the earnings. The heavy through traffic since last harvest benefits this road probably as much as any other, and it will be one of the chief beneficiaries of remunerative through rates.

THE NEW EAST-BOUND RATES are noticeable for the changes in rates on the three higher classes of freight, which have not been modified before since 1874. From 1869 till some time in 1874 the first, second and third-class rates were 160, 125 and 85 cents, respectively. In 1874 they were made 150, 110 and 80 cents. Afterward the third-class rate was made 85, and with the exception of a brief period the

third-class rates (whenever agreed rates have been maintained) has stood at 85 cents for more than eight years. The amount of traffic of the upper classes which goes eastward is quite moderate, otherwise probably the rate could not have been maintained so long. The reduction of about 20 per cent. gives these freights a share in the advantages of cheaper transportation which the lower classes have long enjoyed. The differences are still very great, but this is not so much because high-class freights are too high as because low-class freights are too low.

THE WINTER GRAIN MOVEMENT for the sixteen weeks from December 1 to March 23 has been as follows for the past five years:

The receipts of the eight leading Northwestern markets were:

1877-78	1876-77	1875-76	1874-75	1873-74
41,219,496	32,323,681	37,163,819	25,613,247	40,304,409

The margin in these receipts this year above those of 1873-74 (which were not equaled until last week) has already become considerable (2½ per cent.). The increase over last winter is 27½ per cent.

The shipments of the same eight places were:

1877-78	1876-77	1875-76	1874-75	1873-74
28,309,812	15,814,083	19,405,754	12,481,346	18,325,197

The shipments this winter are nearly 80 per cent. greater than last year, and 46 per cent. greater than in any previous winter.

The receipts at the seven Atlantic ports for the same periods have been:

1877-78	1876-77	1875-76	1874-75	1873-74
54,072,420	30,439,006	28,982,094	14,596,786	20,555,883

This winter's receipts were thus 77½ per cent. greater than were ever known before.

THE FIRST CHICAGO GRAIN FLEET, which sailed about April 1, consisted of 31 vessels, carrying 1,206,000 bushels of grain, about two-thirds corn and one-third wheat. This is a very small amount for the first fleet to take, and is not much more than half of an ordinary week's rail shipments from Chicago. The ruling rates are three cents for wheat and 2½ for corn. There was only one propeller in the fleet; it took 65,000 bushels of corn. The elevator charges at Buffalo have been fixed at ½ cent per bushel, and ½ cent to the vessel, this covering five days storage. This is ½ cent lower than last year. The first cargoes of wheat arriving at Buffalo by lake, therefore, will have cost 3½ cents per bushel before the grain reaches the canal boat. The current rail rate from Chicago to New York has been 12 cents per bushel, but is now raised to 15 cents, probably the first instance in the history of the business when rail rates were raised just as lake shipments began. At the current rates by rail the canal boats will probably be able to command remunerative prices unless the competition with each other for cargoes is excessive; and in any case it is not easy to see how the railroads can continue to command the enormous grain traffic which they have had during the past winter.

THE NEW YORK GRAIN RECEIPTS continue to show an enormous increase over those of previous years, and especially over those of last year, and the New York Central continues to get the lion's share of the business, though the Pennsylvania shows an enormous increase for last month—larger in proportion than the New York Central's even. The total increase in receipts of grain of all kinds for March is 192 per cent. greater this year than last, and 55.3 per cent. of the whole was by the Central, against 39.2 by the other railroads, 5.5 per cent. being by water. Last year 48.2 per cent. of the receipts were by the New York Central, 41.5 by the other roads, and 10.3 per cent. by water. Probably never before has so much grain been delivered at New York by rail as during last March. The nearest approach that we can find to it in previous years is 6,756,000 bushels in May, 1876, and 6,781,000 in October, 1877, against 6,950,000 this last March. The winter grain business of the New York roads this year has been greater than the autumn business of any previous year.

THE BROTHERHOOD OF LOCOMOTIVE ENGINEERS seems to be losing members as fast as ever. The April number of its *Journal* notes 469 expulsions, mostly for "unbecoming conduct" and "violating their obligations." Division 15 (Buffalo) lost 47 members; Division 124 (Mauch Chunk) lost 41; Division 63 (Springfield, Mass.), 37; Division 25 (Terre Haute), 32; Division 74 (Harrisburg, Pa.), 32; Division 49 (East St. Louis), 28; Division 81 (Kansas City), 28; Division 64 (Worcester, Mass.), 26; Division 40 (Portland, Me.), 24; Division 54 (Port Jervis, N. Y.), 19; Division 45 (West Philadelphia), 19; Division 104 (Columbia, Pa.), 15. Others have lost smaller numbers.

Transportation in Congress.

In the Senate on the 29th of March: Mr. Teller, of Colorado, from the Committee on Railroads, reported, with amendments, the Senate bill to incorporate the National Pacific Railroad & Telegraph Company. Placed on the calendar. It authorizes the corporations to construct and operate a railroad and telegraph line from Cheyenne to Fort Laramie, thence to Deadwood, and from Fort Laramie to Fort Fetterman; thence in a northerly or northwesterly direction to the Yellowstone River, near the mouth of the Big Horn River; thence to Helena, Montana, and thence to Portland, Oregon. It gives the company the right of way through the public lands, including the necessary grounds for stations, buildings, etc., not to exceed 160 acres for each station. The capital stock of the company is fixed at \$35,000,000, in shares of \$100 each.

Mr. Teller also reported, with amendments, the Senate bill to authorize the construction of a narrow-gauge railroad from Bismarck, Dakota, to the Black Hills, the capital stock to consist of 30,000 shares of \$100 each. Placed on the calendar.

In the House on the 29th of March: Mr. Blair, of New Hampshire, introduced a bill to facili-

tate the judicial construction of the fifteenth section of the Pacific railroad act of 1867. Referred.

Mr. Rice, of Massachusetts, introduced a bill to establish a Board of Pacific Railroad Commissioners. Referred. The following are the principal provisions of the bill: Within three months after the passage of the act the President shall appoint three persons, one of whom shall be skilled in the law and another thoroughly acquainted with railroad business. These persons shall be constituted a Board of Commissioners, and shall hold their offices for one, two and three years respectively. The board shall have a general supervision of the various Pacific Railroads, and the action of the majority shall be the action of the board. It shall be the duty of the board, as often as need be, to examine the several roads and the books and papers of the companies and the rates and charges for which they carry freight and passengers. The board shall have the power of settling the differences which may arise between any of the corporations, and whenever any one of them shall fail to perform any of its duties, or fail to comply with the acts of Congress or the law of the land, the board shall make such laws and regulations in said respect as it may seem proper. Any party aggrieved may file a bill in equity in the Circuit Court of the United States, setting forth the matter of complaint, and such suit shall have precedence of all other business in any court in which it may be pending. The commissioners are required to make a report to Congress in January of each year. It further provides that the commissioners shall receive a salary of \$10,000 per annum, and they shall be allowed a clerk at a salary of \$2,000 per annum, which salaries and expenses shall be paid by the railroads in proportion to their gross receipts.

Mr. Willis, of New York, offered a resolution directing the Judiciary Committee to ascertain all the facts and circumstances relating to the making of two contracts between the Union Pacific and the Kansas Pacific railroads, bearing date respectively about 22d or 23d of April, 1873, and report such facts and circumstances, and also whether such agreements were in contravention of general or special laws. Referred.

In the Senate, April 1:

Mr. Mitchell, of Oregon, from the Committee on Railroads, reported a bill to extend for eight years the time for the completion of the Northern Pacific Railroad. Placed on the calendar.

This bill, which was adopted in the committee by a vote of 6 to 2, has amendments to the bill asked for by the company, which provide that the company shall, within nine months after the approval of the act, begin the construction of its road at Umatilla; and shall, within one year thereafter, construct eastward twenty-five miles, and each succeeding year forty miles; and the company is required to begin, one year after the passage of the act, the construction of a road at the portage of the Lower Cascades around the Columbia River; the same to be completed one year thereafter, and the whole road, from end to end, to be completed within eight years. In the event of failure to begin the work at the Cascades as specified, all the grants and franchises, so far as they relate to the railroad between Portland and Umatilla, Oregon, shall vest in the Portland, Salt Lake & South Pass Railroad Company, which shall be required, within three months after such failure, to begin at Portland and construct on the south side of Columbia River, the first year, thirty-three miles, and each succeeding year twenty-five miles, until the road is completed from Portland to Umatilla. The lands of the Northern Pacific Company are to be sold by the Government as in the former bill. Congress reserves the right to alter, amend or repeal the act at any time, and the right to provide by law against unjust discriminations and excessive charges on the part of the company. The bill, as reported from the sub-committee, provided that the construction of the road should begin at Portland. This, however, was strenuously opposed by Senator Grover, and in order to harmonize the measure, Senator Mitchell acceded to the wishes of his colleague to begin at Umatilla, and also to construct the portage road as provided by the amendment.

Mr. Windom, of Minnesota, dissented from the report of the committee, and afterward introduced another bill for the completion of the road. Referred to the Committee on Railroads.

Mr. Beck, of Kentucky, and Mr. Christiancy, of Michigan, spoke in favor of the Judiciary Committee's Pacific railroad sinking fund bill.

In the Senate on the 2d:

Mr. Morrill, of Vermont, advocated the passage of the Judiciary Committee Pacific railroad sinking fund bill.

Mr. Thurman, of Ohio, gave notice that he would offer an amendment to the pending bill making the first mortgage bonds one of the class of securities in which the proposed sinking fund may be invested.

Mr. Blaine, of Maine, questioned the wisdom of some of the provisions of the bill, but was anxious for a definite settlement.

Mr. Sargent, of California, opposed the Judiciary Committee bill.

A bill providing for a survey for a railroad from Austin, Texas, to Topolovampo was reported. Placed on the calendar.

In the House on the 2d:

Mr. Kidder, of Dakota, introduced a bill for the construction of a railroad from Lake Kampeska, Dakota, northwest to Bismarck, being an extension of the existing line of the Winona & St. Peter Railroad.

In the Senate on the 3d:

The discussion on the Pacific Railroads sinking fund bill was continued, a number of Senators joining in the debate. No conclusion was reached, but it was expected that a vote would be called for April 4.

Cost of Maintaining Different Kinds of Cars—Painting Cars and Cleaning Paint.

The regular monthly meeting of railroad men and others was held March 21, at 7 o'clock, at the rooms of the Master Car-Builders' Association. The President, Mr. GAREY, introduced the subject of the maintenance of cars. He stated that the mileage of many freight cars would not exceed from 5,000 to 10,000 miles per year, while others, notably stock cars, will average from 40,000 to 45,000 miles in the same time. He thought that the cost of maintaining the repairs of oil tank cars would far exceed the average of all other cars in freight service, and would be from 25 to 15 per cent. greater. He could not guess what the mileage of such cars would be, but thought the difference in the cost of maintaining them was due to the construction of the cars and the large loads they carry, and to a certain extent to the fact that their load is liquid. The wood becomes saturated with oil, and although it does not rot, it seems to break readily from that cause.

Mr. SMITH thought that increased cost of repairs of oil-tank cars was due to their greater mileage and to the fact that they run at greater speed and make fewer stops than ordinary cars. On the Lake Shore Railroad the mileage of oil cars was more than one-third greater than that of stock cars, which, with the exception of oil cars, made more mileage than any other cars in the freight service. Oil cars run more than twice as far as the box cars and about three times as far as the other freight cars.

Mr. GAREY thought that continuous long runs with few stops were less injurious to cars than short runs with many stops, as the action of the brakes in the latter case had a very injurious effect upon the wheels. He also called attention to the fact that petroleum is used for painting cars, and if it is destructive to timber he thought its use for that purpose could not be recommended.

Mr. WIENER said that it is a very poor material for painting; that linseed oil and turpentine he had found to be the best materials for painting cars. They should be first primed with linseed oil so that it will be dried into the wood, and this should have at least a week to become thoroughly dry. The great mistake usually made in painting cars is that the work is hurried too much. After the priming is dry the car should have from two to three coats on top of it, and each one should have at least two days to dry. When the striping and lettering are put on, the car should have one coat of rubbing varnish and two coats of the other varnish. If the best material is used the paint will last from two to three years longer than poor oils and paints will. The light colors will stand better than dark ones, because the latter attract heat, whereas the first reflect it.

Mr. GAREY asked, if cars were painted in the manner recommended by Mr. Wiener, how long it would take to finish the painting of a car from the time the first coat was put on?

Mr. WIENER replied that for really good work it would take about six weeks, but at any rate it should have five weeks.

Mr. GAREY said that the only service performed by the paint was to protect the wood. Could not that be done with less time?

Mr. WIENER said no. The reason the oil should never be used after the first coat is that the moment you put varnish on there is no chance for the fatty substance of the oil to penetrate through. Whenever you see blisters on a car some of the under coats were not dried. This is because the under coat that cracks has not had sufficient time to dry. Varnish will wear better on quick flat colors than on others.

Mr. SMITH asked whether there is any difference in the wear of paint on roads on which coal is used for fuel and on others where wood is used? He had heard that the coal gas was injurious to paint.

Mr. WIENER thought that wood ashes would have a more injurious effect than coal ashes, because rain might cause the lye in the wood ashes to eat into and destroy the paint.

Mr. GAREY said that seven coats of paint in five weeks was rather tedious. If they had iron cars they could paint them and have them out in ten days.

Mr. BAKER asked if it would not cost more to clean an iron car than to paint it.

Mr. WIENER said it would. It is not the material, it is the labor of putting it on that costs. An article which will stand three months longer on a road is worth more than the whole cost of the article to the company. If you have any coat of under paint that was soft and blisters it will be sure to crack. He had seen a car on which the paint was cracked clean down to the wood. It was thought that the varnish had cracked it. He said that if that had been the case it would not have gone below the varnish, but the cracking of the wood showed that one of the priming coats was soft, because every coat of that had cracked. They probably hurried one of the coats, and that was the reason of the cracking.

Mr. BAKER said that then, if they were in a hurry, they should use just as little oil as possible.

Mr. WIENER said they should; and then they must have a durable varnish for the outside coat to protect the paint.

Mr. GAREY said that he had known of a car which had been built, painted and varnished and put into service within two weeks from the time it was commenced, and it did good service.

Mr. WIENER said that might be, but it would not wear any length of time. When a car is hurried like that the fewer coats of paint it has the better. In such a case he would put in as little priming with as little oil as possible, and then let it set long enough to put on the filler, but he should put on the coat of varnish, and it would look well, but it would not look well unless they have some oil in the first coat. If they did not have enough oil in to make it adhere to the wood, then the whole thing would go, because the other coat would stick to the first.

Mr. GAREY said that Mr. Wiener did not believe in elastic paint.

Mr. WIENER said he did not, unless it had more than one coat with dryers.

Mr. SMITH spoke of a baggage car which was built, painted, striped, lettered and varnished in one day.

Mr. GAREY asked what was the best thing to clean paint.

Mr. WIENER said pumice stone and hard soap.

Mr. BAKER asked if he had ever used soft white soap.

Mr. WIENER said he had, and dozens of other things. The alkali in the soap, although it may not do so at once, would ultimately have a tendency to eat into the paint. The cheapest and best material is that which has the least alkali in it.

Mr. BAKER asked about fish-oil soap.

Mr. WIENER said it was a good washing fluid, and the best thing manufactured for washing trucks, and for going over paint quickly after taking off the loose dirt, but it should never be used to clean varnish. If it is allowed to remain on paint it will surely eat into it. Washing soda and potash will do the same thing. In washing cars, however, a small quantity, about a gill put into a pail of water, will do no harm. Before iron is painted it should be washed off with potash to remove the rust.

Mr. GAREY announced that the next meeting would be the last of the season, and that it was expected that a paper would be read on the uses of iron and steel in the construction of cars.

The meeting then adjourned.

The Execution of the Missouri Railroad Law.

Some remarks in a recent number of this paper about the railroad law of Missouri, have not given pleasure to a correspondent of the *Railroad Gazette*. We grieve to see that he considers them "senseless gabble," but marvel much, that, with such an opinion of them, he thought it necessary to reply at great length and with much heat. We do not perceive that he successfully controverts any statement made by us. We asserted that the Missouri law was a matchless piece of idiocy. To prove this, nothing more is needed than the undisputed fact that the Legislature passed early in 1875 a law which it was immediately found utterly impossible to enforce at all until 1878, and therefore no effort whatever has been made to enforce it for three years since its passage. Was there ever a legislature before which passed an act, upon a subject of such importance and general information, without discovering that previous legislation had made it impossible to apply the act to any one of twenty-three corporations supposed to be affected thereby, until after three years had elapsed, if ever? In view of this shining feat of idiocy, it is scarcely necessary to add that in its provisions the bill was exceedingly absurd, contradictory, impracticable and ridiculous; that railroad men are not yet weary of pointing out its stupidities; that if it can be enforced it will leave only one road in the State that can pay interest on its debt, and yet, on some important classes of freight, it permits, by mere ignorance of its framers, charges far higher

than the roads have been making without restraint. This is the law which, it is asserted, will now be executed without resistance. In support of our prediction that the act would produce a very large crop of lawsuits, it is enough to say that the Hannibal & St. Joseph road, upon the advice of its attorneys, has decided to refuse obedience to the law and to test its validity as applied to that company. Other corporations are meditating a similar course. The restraining motive, in some cases known to us, is not a belief that the law can be sustained as against the franchises which the companies hold, but a conviction that in Missouri, as in Iowa, common sense will soon resume its sway, and perhaps the sooner if the railroads take pains, by fully obeying the law, to show how absurd it is.

Another critic, in a letter to us, suggests that we may have overlooked the legal effect of the seizure of roads and franchises by the State, and their sale under conditions named in the acts of 1868-70. On the contrary, the legal effect of those sales has been fully considered, in the light of the franchises previously granted, the debts created under those franchises and decisions of the Supreme Court as to the power of legislatures in such cases. If a franchise once granted in positive terms can afterward be taken away by implication—if a State, because empowered to seize and sell a road and its franchises, can thereupon so change those franchises as to impair the obligation of contracts between the roads and other creditors, and destroy their security, then the Missouri law can be enforced in some cases. But even then it will be found impossible to enforce it against some of the chief competing lines, and impracticable as well as unjust to compel one of two competing routes to obey the law while the other is able to disregard it.—*The Public*, April 4.

President Scott's "Palatial" Office.

With mouths wide open the stockholders of the Pennsylvania Railroad Company on Tuesday watched the magnificent flight of Mr. Daniel Dougherty into the upper ether of oratory, as the spreading wings of his fervid eloquence soared in imagination through Colonel Scott's private office, into which he had been invited the other day. "Why, gentlemen," cried he, as he spread his arms out eagle-fashion, and "posed" with his shapely legs on the top of a window-ledge, "Why, gentlemen, it was the most gorgeous place I ever was in. It was palace-like; indeed, it far surpassed anything I ever saw in Genoa," and he rolled the emphasis down on the first syllable with force enough to crush it, and soared away on the "a" until the acoustic properties of the hall were taxed to their greatest capacity. "I tell you, gentlemen of the jury—I mean, gentlemen—stockholders, the chamber far outshone in splendor the council board of the ministry about which I have seen gathered the rulers of an empire on whose shores the sun never sets—it beat all hollow the dazzling gingerbread work of the legislative halls of the greatest nation the sun ever—" Here a pane of glass cracked behind the brilliant orator, and diverted his thoughts into another channel, and the stockholders breathed more easily.

The remarkably large vote cast on Wednesday for the new board of directors, and especially for Colonel Scott, it has been ascertained beyond all doubt, was due to the desire of most of the stockholders who heard Mr. Dougherty's description to see Colonel Scott's room. All day long the stairs were swarming full with visitors to the second story, and Captain Green had to take a holiday from his work in order to be ordinarily courteous to the visitors. The eyes of each awestricken stockholder, as he reached his hand out for the door-knob, might have been seen to stretch wider open than ever before. Each man was indeed surprised when he opened the door.

The room was not large nor the ceilings specially high, but the walls were of that dazzling whiteness peculiar to half-rough plaster which has caught the dust for several years. The few but appropriate ornaments on these walls were striking, if not remarkable, consisting as they did of three enormous paper maps—one "of the greatest nation the sun," etc., another of the Keystone State, showing the counties in brilliant and varying colors, and the third of the main line of the Pennsylvania Railroad, as it runs between Pittsburgh and Philadelphia.

But the distinguishing characteristics of the walls were not maps alone, for Morgan, the late English banker, looks down out of a fine specimen of the photographic art in a frame of real walnut, or it might have been of the stately poplar. "This," whispered Captain Green, with a wicked wink in his eye, "was a gift from across the waters." Horrified by this disclosure the shocked stockholder gave his attention to the furniture in the gorgeous office. He saw with wonder that it was "after" the antique. It even looked as though it might have been "before" the antique, if age was the criterion. One easy-chair—some stockholders inquired what right their president had to sit in an easy-chair—was evidently the "show" piece of antique in the room. The fidelity with which age was simulated was so marvelous that many believed that it was "the real thing." Inquiry developed that it, too, was a gift to the "man who sleeps in his honored grave." In one corner was a desk; it was a large desk, to be sure, and it, too, was apparently ancient. A closer inspection showed that it had originally been veneered, but much battering made it look as though it had once had the small-pox. It had the added luxury of pigeon-holes. In front of it sits, earning his salary, from early morn to dewy eve, Captain Green, Colonel Scott's right-hand man. Then there was a table with a cover that was once refreshingly green, but has now the soft yellowness of age, enhanced in beauty by the ink spots of years. Beside it is a chair with a back as straight as a poker. It is what is known as a cane-bottomed chair, and it once could have been made to revolve. Standing on the table (not all the time, but about two o'clock each day), the antique surroundings of the room being marred in this one instance, but standing there when the stockholders came in, was a real seven-pennybit tumbler filled with milk, watered more than the milk of the wealthiest stockholders, whose maid-servants number many. Beside the milk, on a piece of ceramic from the famous Trenton potteries, was a piece of bread, and brown bread at that. "This," again whispered Captain Green, mysteriously, "this is the president's sumptuous banquet." But more palatial than everything else was a large, fat-looking lounge, whose upholstery, stained through years of pressing, is protected from rough usage by a cover of cotton, also elaborately ornamented with marks of the oil of Macassar from the ambrosial locks of the tired president and mud from the heels that had tramped through many winters and summers. And then last, but not least, the carpet. It is a genuine ingrain, of subdued color—so subdued that it looks as though it is pale with fright at the knowledge that its last hour had come.

Upon this sight the stockholders who had heard Mr. Dougherty describe it, looked with amazement—but not at the room.—*Philadelphia Times*.

—Mr. W. H. Morse, who last week resigned his position as President of the Boston, Barre & Gardner Company, was a banker at Worcester, Mass., and has just gone into bankruptcy. There is a strong local feeling against him, and he is accused of very doubtful dealings.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends have been declared as follows:
Housatonic, the usual quarterly dividend of 2 per cent. on the preferred stock, payable April 15.
Ogdensburg & Lake Champlain, the usual semi-annual dividend of 4 per cent. on the preferred stock, payable April 1.
Cumberland Valley, the usual quarterly dividend of 2½ per cent.
Atlanta & Charlotte Air Line, 1½ per cent., quarterly. The company was reorganized last year, and the stock represents coupons funded.
Berkshire (leased to Housatonic), 1½ per cent., quarterly, payable April 1.
Lowell & Lawrence (leased to Boston & Lowell), 2½ per cent., semi-annual, payable April 1.
Sioux City & Pacific, 3½ per cent., semi-annual, on the preferred stock, payable April 1.
Vermont & Massachusetts (leased to Fitchburg), 2½ per cent., semi-annual, payable April 6.
Michigan Central, 2 per cent., payable June 1. This will be the first dividend paid since 1873, and the first cash dividend since 1872.

Foreclosure Sales.

The Chesapeake & Ohio road was sold in Richmond, Va., April 2, under concurrent decrees of the Virginia and West Virginia courts, and bought for \$2,500,000 by A. S. Hatch, representing the Committee of Purchase and Reconstruction appointed by the bondholders. The sum bid is sufficient to cover the prior liens, expenses of foreclosure and other charges on the road. The road is 428 miles long, with six miles of branches; the amount of bonds issued under the foreclosed mortgages was by the last report \$26,366,000. A plan of reorganization has been adopted by a large majority of the parties in interest.

The Ohio Central road was sold under foreclosure at Bucyrus, O., March 26, and was bought for \$107,000 by J. T. Brooks as attorney for some of the bondholders. The road, formerly the Atlantic & Lake Erie, is completed from Moxahala, O., to New Lexington, 9 miles, and from Bremen to the Pittsburgh, Cincinnati & St. Louis crossing near Newark, 27 miles, the two sections being connected by the use of the Cincinnati & Muskingum Valley track.

The Utah Northern road was sold at Salt Lake, Utah, April 3, under a decree of foreclosure granted some months ago. Bought for \$100,000 by Mr. S. H. H. Clarke, General Superintendent of the Union Pacific, representing the parties in interest, who have agreed upon a plan of re-organization. The road is of 3 ft. gauge and is in operation from Ogden, Utah, to Franklin, Idaho.

The section of the New Jersey & New York road from Hackensack, N. J., to the junction with the Erie, about 4½ miles, will be sold May 29 by Wm. M. Johnson, master, under a decree of foreclosure of a first mortgage for \$100,000 made by the old Hackensack & New York Company. The decree is granted by the Chancellor of New Jersey.

Boston & Albany Mutual Relief Association.

The eighth annual meeting of this association was held in Springfield, Mass., March 27. The Secretary's report showed that there were 20 deaths among the members last year, of which only four were violent. Three of these were brakemen who were killed on the road, and the fourth was the watchman who was burned to death in the car-shops fire. The sum paid to the families of the deceased members was \$15,546, an average of \$777 to each. Thirty-six new members were received into the association during the year, and 140 withdrew, most of them on account of leaving the road. The total membership now is 720. Three of the members who withdrew died within three months thereafter. The total amount paid out by the association since its organization eight years ago is \$70,465. Another meeting will be held April 12 to consider the expediency of taking the employees of the Connecticut River Railroad into the Association.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—Mr. R. L. Engle has been appointed Division Engineer, and will take charge of the tunnel work in the Eaton Pass on the extension of this road. His headquarters will be at Trinidad, Colorado. Mr. Engle was lately Division Engineer on the Cincinnati Southern.

The general eastern agency of this company will, after April 1, be under the charge of Mr. L. H. Nutting, General Eastern Freight Agent, and Mr. C. A. Seymour, General Eastern Passenger Agent, who will have charge of the business of their respective departments in the territory east of Ohio, exclusive of the city of Pittsburgh. The office of this agency will be at No. 239 Broadway, New York.

Bangor & Piscataquis.—At the annual meeting in Bangor, Me., March 20, the following directors were chosen: N. C. Ayer, Newell Blake, M. S. Drummond, Moses Giddings, T. S. Moore, John S. Ricker, A. M. Robinson, Arad Thompson, A. G. Wakefield, J. S. Wheelright, F. A. Wilson. The board elected Moses Giddings President; H. W. Blood, Clerk and Treasurer; Arthur Brown, Superintendent.

Blue Line.—Mr. Beverly W. Dickinson, has been appointed General Western Agent, in place of Col. McDoel, who has gone to the Hannibal & St. Joseph.

Boston & Albany Mutual Relief Association.—At the annual meeting in Springfield, Mass., March 27, C. O. Russell, William H. Stearns, Robert Eccles, H. C. Hamilton, John W. Clark, Marcus Cadwell and A. S. Bryant were chosen trustees for the ensuing year, and A. Holt, Secretary.

Boston & New York Air Line.—Mr. F. A. Johnson has been appointed Cashier, with office in New York.

Cairo & St. Louis.—Mr. M. O'Neil has been appointed Roadmaster. He has for a long time been connected with the road department of the Keokuk & Des Moines.

Mr. Robert Bell has been appointed General Freight and Passenger Agent, in place of J. A. Wentz, resigned.

Chicago, Pekin & Southwestern.—Mr. A. M. Hinckley has been appointed Auditor, in place of S. C. Smith, resigned. Office in Chicago.

Cincinnati, Rockport & Southwestern.—At the annual meeting recently this company was reorganized by the election of the following directors: Joseph Kinsey, George R. Eager, W. O. Rockwood, E. V. Cherry, J. A. Mann, A. Q. Jones, E. H. Sabin, J. Moore, Francis Smith. The board elected officers as follows: President, Joseph Kinsey, Cincinnati; Vice-President, George R. Eager, Boston; Secretary, E. V. Cherry, Cincinnati; Treasurer, W. O. Rockwood, Indianapolis.

Continental Line.—Mr. C. S. Sawyer has been appointed General Manager, in place of M. L. Doherty. From April 1 mileage of cars of this line should be reported to the road whose initials they bear, and the reports to the General Manager discontinued.

Denver Pacific.—The United States Court at Denver, Col.,

has appointed D. M. Edgerton and G. W. Clayton, Receivers. Mr. Edgerton is President of the company.

Empire Line.—Mr. F. M. Bissell has been appointed Auditor, in place of Wm. G. McDowell, resigned. Mr. Preston Butler succeeds Mr. Bissell as Assistant Auditor.

Grayville & Mattoon.—Mr. R. I. Lawrence has been appointed Chief Engineer and General Freight Agent, with office at Olney, Ill.

Hannibal & St. Joseph.—Messrs. Henry M. Benedict, of New York, and Simon B. Armour, of Kansas City, have been chosen directors to fill vacancies.

Col. W. H. McDoel has been appointed General Traveling Agent. He was formerly with the Wabash road, and has been for some time General Western Agent of the Blue Line.

Holly Springs, Brownsville & Ohio.—Col. W. W. Vaughan, of Brownsville, Tenn., is President of this company.

International & Great Northern.—Mr. R. S. Hayes (Vice-President of the company) has been appointed Receiver, on application of the trustees under the consolidated mortgage.

Iowa Railroad Commission.—The Governor of Iowa has nominated as Railroad Commissioners, under the new law, C. C. Carpenter, of Fort Dodge, Peter A. Dey, of Iowa City, and J. W. McDill, of Afton. Mr. Carpenter has been Governor of the State; Mr. Dey is a civil engineer, and was the first Chief Engineer of the Union Pacific, and Judge McDill is a lawyer and has served as Circuit Judge and in Congress.

Maine Central.—At the annual meeting in Augusta, March 27, the following directors were chosen: Abner Coburn, Skowhegan, Me.; Darius Alden, Augusta, Me.; Arthur Sewall, Bath, Me.; John B. Brown, Wm. G. Davis, George E. B. Jackson, Portland, Me.; Willard P. Phillips, Salem, Mass.; Alfred P. Rockwell, George P. King, Wm. B. Bacon, Boston; George S. Morison, New York. The new directors are Messrs. Phillips, Bacon and Morison, who replace Noah Woods, S. C. Lawrence and J. S. Ludlam. Messrs. Rockwell, King, Jackson and Morison are directors of the Eastern Railroad Company.

Michigan Central.—Mr. Dexter Richards, of Concord, N. H., has been chosen a director in place of John V. Barron, deceased.

Missouri, Kansas & Texas.—A telegram from Sedalia announces that Mr. Abram Mitchell has been appointed General Superintendent, in place of A. B. Garner, resigned. Mr. Mitchell is a man of large experience in railroad management and was for a long time connected with the Illinois Central.

New York, New Haven & Hartford.—Mr. John Henry has been appointed Master Mechanic in charge of the Hartford shop in place of S. E. Brewer, resigned.

Panama.—At the annual meeting in New York, April 1, the old board was re-elected, as follows: John R. Marshall, Charles G. Franchlyn, Trenor W. Park, S. C. Thompson, John M. Burke, Charles E. Leverich, I. G. McCullough, Joseph Ogden, Andrew Boardman, Frederick Butterfield, H. H. Baxter, Thomas Maddock, George A. Hoyt.

Pennsylvania.—Mr. John Price Wetherill has been chosen one of the Philadelphia city directors, in place of P. A. B. Widener, who was chosen by the city council, but afterward found to be ineligible.

Peoria, Pekin & Jacksonville.—The Circuit Court at Peoria, Ill., has appointed Mr. John Allen (President of the company) Receiver of this road. Mr. Allen has been President of the road for many years, and has an excellent reputation for honesty and ability, both as an old and successful merchant, and as manager of the road during a period of great business difficulty.

Pittsburgh, Wheeling & Kentucky.—At the annual meeting in Wheeling, W. Va., March 29, the following were chosen: President, C. D. Hubbard; directors, H. G. Lazear, John McLure, M. Reilly, Wm. Thaw. The board elected J. M. Belleville Secretary; John M. Harding, Assistant Secretary; W. H. Barnes, Treasurer.

PERSONAL.

—Mr. Benjamin Van Lew, Superintendent of the Reading & Columbia Branch of the Philadelphia & Reading road, died in Columbia, Pa., March 27, aged 47 years. He was born in Philadelphia, learned the machinist's trade, and then went on the Reading road as a fireman, and afterward as engineer. In 1865 he was appointed Master Mechanic of the Reading & Columbia road, and became Superintendent a few years later.

—Mr. George P. Bowler, one of the principal owners of the Kentucky Central, died in Paris, France, March 24, aged 32 years. He was one of the "Bowler heirs," whose suit with the Covington & Lexington Company lasted for half a generation, and was finally ended by a compromise.

—Mr. J. A. Wentz has resigned his position as General Freight and Passenger Agent of the Cairo & St. Louis road.

—Frank J. Macdonald, freight agent at Toronto for the Northern Railway of Canada recently left suddenly for the United States. He is believed to be a defaulter to a considerable amount, and his accounts are now being examined.

—The gentlemen named as Pacific Railroad Commissioners, should the bill providing for such a commission become a law, are Charles Francis Adams, Jr., Albert Fink and Hon. Thomas M. Cooley. Messrs. Adams and Fink are too well known to require further description; Judge Cooley is Judge of the United States District Court for the District of Michigan, a Professor in the law school of the University of Michigan, and the author of several standard law treatises. He was spoken of recently as likely to receive an appointment as United States Circuit Judge. It is doubtful if three abler and more upright men were ever named as associates in one office.

—Conly, Mason & Co., railroad contractors, of Greene County, Ind., have filed a petition in bankruptcy. The principal creditor is the Indianapolis Rolling Mill Company, for \$215,412.43, which is secured. Unsecured liabilities amount to \$222,000, held by farmers of Greene and Sullivan Counties and merchants of Bloomfield. Individual debts of members of the firm amount to about \$35,000. Assets in mortgaged land, \$32,000.

—Mr. Mark Hopkins, a director and treasurer of the Central Pacific Company, died at Yuma, Arizona, March 30. Mr. Hopkins settled in California many years ago and was in partnership with Mr. C. P. Huntington in the hardware business at Sacramento, when they, with a few associates, began the enterprise of building the Central Pacific. How they, after many discouragements and apparent failures, pushed it through to completion, has often been told. Mr. Hopkins had acquired a large fortune in his various enterprises, having been largely interested in mining as well as railroad property. He had not been well lately, and his trip to Yuma was taken for the benefit of his health.

TRAFFIC AND EARNINGS.

East-Bound Freight Apportionment.

A St. Louis dispatch of April 3 says: "A meeting of representatives of the Chicago & Alton, Vandalia, Ohio & Mississippi, Wabash, and the Indianapolis & St. Louis rail-

roads was held here to-day, at which the details on tonnage, and divisions and percentage of the roads, were arranged according to an agreement entered into at a meeting held in Chicago last week. These divisions apply to all east-bound freight from St. Louis, Hannibal and Quincy, on the basis of 20 per cent. for each road mentioned. The meeting was entirely harmonious.

Railroad Earnings.

The following are gross earnings for the year ending Dec. 31, as reported to the Secretary of State of Iowa:

	1877.	1876.	Inc. or Dec.	P. c.
Burlington & N. W.	\$16,294			
Chl., Clint., Dubuque & Minnesota	322,660	\$359,176	D.	\$36,516 10.2
Chl., Clinton & West.	9,162			
Crooked Creek	2,709			
Davenport & N. W.	201,510	170,914	I.	30,596 17.9
Des Moines & Fort Dodge	148,434	170,154	D.	21,720 12.8
Des Moines & Minn.	59,089	59,757	D.	668 1.1
Iowa Eastern	17,858	26,129	D.	8,271 31.7
Iowa Coal, Ry. & Mfg. Co.	10,047	12,531	D.	2,484 19.9
Sioux City & Pacific	230,951	219,811	I.	11,140 5.1

Other earnings are reported as follows:

Year ending Dec. 31:

	1877.	1876.	Inc. or Dec.	P. c.
Columbus & Hock'g Valley	\$828,900	\$841,139	D.	\$12,239 1.5
Expenses	471,144	454,305	I.	16,839 3.7
Net earnings	\$357,756	\$386,834	D.	\$29,078 7.5
Earnings per mile	9,313	9,451	D.	138 1.5
P. c. of expenses	56.84	54.01	I.	2.83 5.6
St. L., Alton & T. H. Main Line	953,570	1,072,403	D.	118,833 11.1
Expenses	775,822	800,891	D.	25,069 3.3
Net earnings	\$177,748	\$271,512	D.	\$93,764 16.0
Earnings per mile	4,890	5,500	D.	610 11.1
P. c. of expenses	81.37	80.31	I.	1.06 1.3
St. L., Alton & T. H., Belleville line	518,037	498,743	I.	19,294 3.9
Expenses	282,936	274,192	I.	8,744 3.2
Net earnings	\$235,101	\$224,551	I.	\$10,550 4.7
Earnings per mile	7,296	7,025	I.	271 3.9
P. c. of expenses	54.60	54.98	D.	0.38 0.7

Two months ending Feb. 28:

	1877.	1876.	Inc. or Dec.	P. c.
At. & Gt. Western	\$559,931	\$507,126	I.	\$52,805 10.4
Chicago, Burlington & Quincy	1,956,617	1,748,603	I.	208,014 11.9
Net earnings	821,363	637,067	I.	184,296 28.9
P. c. of expenses	58.04	63.55	D.	5.51 8.7
Mobile & Ohio	460,782	406,775	I.	54,007 13.3
Phila. & Reading	1,518,450	1,996,806	D.	478,356 24.0
Month of February:				
At. & Gt. Western	\$260,879	\$240,577	I.	\$20,302 8.4
Mobile & Ohio	188,790	174,393	I.	14,397 8.3
Phila. & Reading	844,470	1,216,000	D.	371,530 30.6
Third week in March:				
Denver & Rio G.	\$15,996	\$11,807	I.	\$4,189 35.5
St. L., I. Mt. & So.	78,600	90,322	D.	11,722 13.0
Week ending March 23:				
Grand Trunk	\$177,671	\$169,865	I.	\$7,806 4.6

Coal Movement.

Coal tonnages for the week ending March 23 are reported as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Anthracite	133,682	297,448	D.	163,766 55.1
Semi-bituminous	48,525	44,552	I.	3,973 9.0
Bituminous, Pennsylvania	32,319	34,630	D.	2,311 6.7

A slight increase is reported in prices of anthracite at last week's auction sales in New York. Business in bituminous coals is very dull at tide-water, and will probably continue so until tolls and freights for the season are fixed.

The anthracite tonnage of the Belvidere Division, Pennsylvania Railroad, for the three months ending March 31 was:

	1877.	1876.	Inc. or Dec.	P. c.
Coal Port for shipment		491	D.	491 ..
South Amboy for shipment	125,640	125,416	I.	223 0.2
Local distributions on New Jersey lines	40,204	40,142	I.	62 0.2
Company's use on N. J. lines	21,406	17,631	I.	3,775 21.4
Total	187,250	183,680	I.	3,570 1.9

Of the total this year 110,599 tons were from the Lehigh and 76,650 tons from the Wyoming Region.

Grain Movement.

For the week ending March 23 receipts and shipments of grain of all kinds were, in bushels:

	1877.	1876.	Inc. or Dec.	P. c.
Northwestern receipts	2,738,322	1,200,536	I.	1,537,786 111.4
Shipments	1,830,874	670,822	I.	1,160,052 173.1
Atlantic receipts	4,041,054	1,450,695	I.	2,590,359 178.6

The Northwestern receipts are about the average of this winter, but the shipments are below the average and more than a quarter less than the week before. The receipts at Atlantic ports have been exceeded but once this winter or any winter. Of these latter the percentage arriving at each port was: New York, 43.6; Baltimore, 20.7; Philadelphia, 16.8; New Orleans, 8.5; Boston, 6.3; Portland, 4; Montreal, 0.1.

The corn receipts are now becoming very large. Much of the corn-growing country does not ship to any extent before spring, and the crop is often not in condition to ship in the winter. Five-sixths of the New Orleans receipts this year have been corn.

Grain receipts at Chicago and Milwaukee for the month of March for four years have been:

	1875.	1876.	1877.	1878.
Chicago	4,162,879	3,036,794	3,117,532	7,478,072
Milwaukee	1,196,090	1,210,403	479,582	1,359,550

The Chicago receipts are 58 per cent. and the Milwaukee receipts 183 per cent. greater this year than last.

Receipts of grain at New York by different routes during the month of March were:

	1877.	1876.	Inc. or Dec.	P. c.
New York Central	4,068,203	1,214,239	I.	2,853,974 235.1
Erie Railway	1,513,704	886,823	I.	626,881 120.4
Pennsylvania	1,250,484	351,180	I.	908,304 258.6
Other roads	108,289	9,946	I.	99,343 999.0
By water	400,056	259,557	I.	140,499 54.0
Total	7,350,826	2,521,735	I.	4,829,091 192.0

The percentages arriving by each route were:

	1877.	1876.
New York Central	55.3	48.2
Erie	20.6	27.2
Pennsylvania	17.1	13.9
Other roads	1.5	0.4
By water	5.5	10.3
Total	100.0	100.0

The New York Central delivered 33 per cent. more than all the other roads put together this year, and 16 per cent. more last year.

Baltimore grain receipts in March were as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Flour, barrels	102,744	94,990	I.	7,754 8.2
Wheat, bushels	513,606	84,146	I.	429,460 510.4
Corn	2,980,468	2,432,133	I.	548,335 22.5
Other grain	64,767	52,094	I.	12,673 24.3
Total grain	3,558,841	2,568,373	I.	990,468 38.6

Total grain and flour, 4,072,561 3,043,323 1,029,238 33.8

For the three months ending March 31 receipts were:

	1877.	1876.	Inc. or Dec.	P. c.
Flour, barrels	305,063	286,179	I.	18,884 6.6
Grain, bushels	8,800,882	7,279,676	I.	1,521,186 20.9
Total, bushels	10,326,177	8,710,571	I.	1,615,606 18.5

March exports of flour were 45,442 barrels; of grain, 466,723 bushels wheat, and 2,423,080 bushels corn.

East Bound Rates.

The tariff agreed upon at the Chicago meeting last week and which went into effect April 1 is based on the following rates in cents per 100 lbs. from Chicago to New York:

Class.	1.	2.	3.	4.	Grain.	Bulk.	Fresh.	Poultry.	Cheese.
	130	90	70	30	25	35	75	70	40

The rates of the tariff last agreed upon, which was to take effect March 1, but was never really enforced, were:

Class.	1.	2.	3.	4.	Grain.	Bulk.	Fresh.	Poultry.	Cheese.
	150	110	85	30	30	35	75	85	40

This is the first time since 1874 that any change has been made in agreed rates on the three upper classes. The amount shipped of these classes is not very large—nothing like so large a proportion of the whole as the westward shipments of the corresponding classes. The reduction is nearly 20 per cent. on these classes.

The only other change is the reduction of grain from 30 to 25 cents, and of poultry and game (refrigerator freight) from 85 to 70. The latter is not an important freight at this season.

The fourth-class and grain rate from St. Louis is 5 cents higher than from Chicago. The usual differences to Boston, Philadelphia and Baltimore are made. Rates to Montreal are the same as to New York. To some of the interior cities the rates on the chief classes are from Chicago:

	Class.	1.	2.	3.	4.	Grain.	Bulk.	Fresh.	Poultry.	Cheese.
Albany	1	10	80	65	25	20	30			
Buffalo	65	50	38	18	28	20%				
Dunkirk	90	47%	37	17%	16	20				
Erie	55	45	35	17	15	19%				
Pittsburgh	50	40	30	16	14	18%				
Cleveland	40	30	25	12%	10	15				
Detroit and Toledo	40	30	25	12%	10	15				

Norfolk Cotton Business.

Cotton receipts at Norfolk, Va., in March were 29,364 bales, an increase of 8,473 bales, or 40.7 per cent. over 1877. For the seven months of the cotton year, from Sept. 1 to March 31, the receipts were, in bales:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
At. Mississippi & Ohio R. R.	182,580	199,122	D.	16,542 8.3
Seaboard & Roanoke R. R.	158,021	243,056	D.	85,035 35.0
Canals and otherwise	39,486	39,249	I.	237 0.6
Total	380,087	481,427	D.	101,340 21.1

Of the receipts this year 172,529 bales were local, consigned to Norfolk, and 207,556 bales were bound through to points beyond.

RAILROAD LAW.

Fire—Contributory Negligence.

In Richardson against the Louisville, New Albany & Chicago Company, the plaintiff brought suit to recover damages for burning her house and other property, caused by the negligence of the appellant in running its locomotive without sufficient spark arresters on the smoke stack thereof. Answer in general denial. Trial by jury, and a general verdict for the plaintiff. The jury also, in answer to interrogatories propounded by the defendant, specially found that the fire which destroyed plaintiff's property originated in the upper story thereof; and that she had left open the window of a room fronting on the railroad, in which was bedding, etc. The appellant moved the court to render judgment in its favor on the special finding of the jury on the ground that the same showed contributory negligence. This motion was overruled, and judgment rendered on general finding. On appeal, the Indiana Supreme Court decided as follows:

"We are of the opinion that the special finding of the jury established facts which clearly show contributory negligence on the part of the appellee and the conclusion of the jury, that there was no negligence on the part of the appellee, will not affect the facts found, and the verdict must stand as though no such conclusion had been expressed. The principle of law that there can be no recovery when there is negligence contributing to the injury, is well settled. The court should have rendered judgment in appellant's favor on the special finding of the facts. Where special findings are inconsistent with the general verdict, they will control, and judgment should be rendered accordingly. Judgment reversed.

Adjustment of Claims for Damages.

In Heart against the Seaboard & Roanoke Company, the North Carolina Supreme Court held that it is lawful for a railroad company to stipulate in its bills of lading that all claims for damages shall be made by the consignee at the delivery station before the goods are taken away. Under such a stipulation the company will be relieved from liability in cases where the stipulation is disregarded, except where the injuries are latent and cannot be discovered without further examination.

Limitation of Lay-over Checks.

In the case of Giddings against the Housatonic Company, the United States Circuit Court for Massachusetts held that it is lawful for a company to issue tickets "good for one continuous passage from X. to Y." and to give notice that no lay-over checks will be given. The company can enforce such a regulation and no damages can be recovered by a passenger who is ejected from the cars for disregarding the regulation, when due public notice of the same has been given.

Employee's Injury—Contributory Negligence.

In the case of Sullivan against the Toledo, Wabash & Western Company, the plaintiff's son was employed on the company's gravel train. While on the engine drawing said train, a collision occurred by which the son of appellant was killed, and this suit was brought to recover damages for such death. A demurrer to the complaint on the ground that the same did not state facts sufficient to constitute a cause of action was sustained, and judgment was rendered on the demurrer. An appeal was taken and the Indiana Supreme Court held: That, as a general rule, a principal is not liable to one of his servants for injuries sustained through the neg-

ligence of another servant, when both are engaged in the same general business. There is no averment in the complaint, which will take the case out of the general rule as stated and uniformly supported by authority. In a complaint seeking damages for the negligence of another, in plaintiff's own right, where the question is one of mere negligence, it must be shown by direct averments that plaintiff did not contribute to the injuries complained of, or it will be held insufficient. No such averments are made in this complaint. When the injured party is dead, the person who sues in his own right must show that he also was without negligence.

Judgment affirmed.

Limitation of Liability for Baggage.

In the case of Alexander Brown against the Camden & Atlantic Co., just decided in the Pennsylvania Supreme Court, Brown brought suit in the Philadelphia Court of Common Pleas to recover for lost baggage. The plaintiff and wife were passengers for Atlantic City in 1873, and checked their trunk, which was never delivered.

The Court below held that the amount of damages to be recovered was governed by the law of New Jersey, prescribing the liability of common carriers in that State, and that, therefore, as by that law it was provided that the maximum amount that could be recovered was \$100 per every 100 pounds, the recovery was restricted to that amount unless it was shown that the company had failed to prove that they had put up notices to the above effect, as required by law, or that Brown had paid an extra charge for the value beyond the \$100 allowed by law. The jury, finding that the company had complied with the requirements of the law, and that Brown had not given notice and paid an extra charge on the excess of value contained in his trunk, gave a verdict in the sum of \$100 for the plaintiff. From this judgment the latter took out a writ of error, contending that the case was not governed by the New Jersey statute, and that even if it were, a special, direct notice of the limitation of the company's liability would be necessary to reduce the liability placed upon it, under the common law. The Supreme Court, however, sustains the judgment of the lower tribunal, holding that the case is governed by the New Jersey statute and that the notice given was all that was required thereunder.

Mail Service Over Leased Tracks.

The cases of the Philadelphia & Baltimore Central Railroad Company against the United States, and the Philadelphia, Wilmington & Baltimore Railroad Company against the United States, were some time ago sent to the Court of Claims by the Postmaster-General for decision, under the authority derived from Sec. 1063 of the Revised Statutes. It was assumed in the argument before the court that the same principles may govern the two decisions. The question at issue was compensation claimed by those roads for services performed. Judge Davis recently delivered the opinion of the court, holding that a railroad company carrying mails over the rails of another road, in its own cars, with its own servants, and by means of its own engines, is entitled in its dealings with the Post-Office Department to regard the hired track as a part of its own road, even though another mail service may be performed over the same track by another company. A railroad company operating a main line, and a branch line joining the main line at a point between its termini, may under the provisions of the Act of March 3, 1873, operate two distinct postal routes over the portion of the main line between one of the termini and the junction. On the facts in the case, a company transporting mails on a railroad route under the provisions of said act, and accepting without objection less compensation therefor than is named in the statute, cannot recover more than the sum so accepted.

The terms "post road" and "post route" are used indiscriminately in postal statutes; nevertheless there is ground for holding that the term "post road" ordinarily signifies a highway by land or water, made by statute an avenue over which mails may be lawfully transmitted, and that the term "post route" ordinarily signifies a post road, or definite portion thereof, over which mails are usually transported by contract. The judgment of the court is that the Philadelphia & Baltimore Central Railroad Company is entitled to recover the sum of \$1,299 and the Philadelphia, Wilmington & Baltimore Railroad Company, \$9,250.

THE SCRAP HEAP.

Railroad Manufactures.

The West Chester & Philadelphia Company is putting in its freight depot at Philadelphia a large railroad track scale of Riehl Brothers' make. The scale is the one exhibited at the Centennial, 80,000 lbs. capacity, with new style double beam. A similar scale was recently put up at the Washington Street Elevator in Philadelphia for the Pennsylvania Railroad Company. The Reading Company has also adopted the same style as a standard.

The Revolving Scraper Co., of Columbus, O., send to the Paris Exposition highly-finished samples of their goods and also specimens taken from the stock on hand. The company will be represented at Paris by its European agents, Selig, Sonenthal & Co., of London, England.

J. O. D. Lilly & Sons, manufacturers of varnishes and japans, at Indianapolis, Ind., report a greatly improved business for the first quarter of 1878, better than at any time since 1873. Sales have been nearly 100 per cent. better than in any quarter for the last three years.

The Wabash Railway shops at Fort Wayne, Ind., recently turned out a new passenger engine weighing nearly 40 tons. The engine has 17 by 29 in. cylinders, drivers 69 in. in diameter and 8 ft. 6 in. between centres. The boiler is 54 in. diameter and has 175 flues, 11 ft. long, fire-box 6 ft. long.

The Laclede Rolling Mill, at St. Louis, has resumed work after a short stoppage.

The new Sarah Furnace, at Ironton, has gone into blast.

The Susquehanna Iron Co., at Columbia, Pa., is running its mill full double turn, to fill orders.

The Wheeler Iron Co. has started the rolling mill at West Middlesex, Pa.

The Pittsburgh Bridge Co., organized in January last, has established shops in Pittsburgh and is prepared to build bridges, roofs and other iron structures. The company will pay special attention to highway bridges. The officers are: George Devin, Manager and Engineer; A. F. Brown, Assistant Engineer; John A. Nichols, Superintendent of Construction; Wm. L. Abbott, Treasurer.

The Culmer Car Spring Co., at Pittsburgh, is making the springs for the cars of the Gilbert Elevated road.

Anderson & Passavant, at Pittsburgh, are making the crucible steel wire for the East River Bridge. The works are making two tons per hour of crucible cast-steel wire rods.

Quinnimont Furnace, at Quinnimont, W. Va., has been leased to J. H. Burnwell, and will go into blast soon.

The Kimball Manufacturing Co., at San Francisco, is building 13 cars for a horse railroad in Oakland, Cal.

The Schenectady Locomotive Works recently delivered an engine to the Atlanta (Ga.) Rolling Mill quit work April 1 and refused to go back until they received the back

wages due and are promised their pay hereafter in money and not in store-orders.

In addition to cars now being built the Tiffany Refrigerator Car Co. last week received an order for 50 more cars from a large dealer in dressed beef for export. On April 1 several cars left Southern points for New York and St. Louis with strawberries, and there is a large demand for cars for fruit and early vegetables.

John A. Roebbing's Sons, at Trenton, N. J., are now making large shipments of Bessemer steel wire for the East River Bridge. Some of the steel tested bore a strain of 180,000 lbs. per square inch. They are also at work on a contract for telegraph wire, and on a bridge for South America. A shipment of wire will soon be made to Australia.

The LaGrange iron estate in Stewart and Houston counties in Tennessee was recently sold to Justice & Co., of London, England, for \$190,000. The property is on the Tennessee River, near the crossing of the Louisville & Nashville's Memphis Line, and includes 40,000 acres of land, on which are several immense beds of brown hematite ore. There are three charcoal blast furnaces on the property, one of which has not been in use since the war.

The Boston & Albany shops at Springfield, Mass., have orders to raise the sides of all the coal cars on the road from 18 to 25 inches, increasing their capacity from 10 to 13 tons.

A Train Struck by Lightning.

The Cleveland (O.) *Herald* of March 28 says: "The north-bound train on the Cleveland, Tuscarawas Valley & Wheeling Railway, when between Massillon and Fulton yesterday afternoon, was struck by lightning. The engineer and brakeman received slight injuries about the head and lower limbs, but the passengers escaped without more than a terrible shaking up and a sudden fright. The baggage car was somewhat shattered, and, after the effects of the shock had passed, the conductor passed through, exhibiting some large pieces of the timbers where the car was shattered. The report of the electric flash was as if a cannon had exploded in the centre of the train. As quick as the flash every passenger was raised from his seat, and some felt the shock some minutes afterward. It was miraculous that the lightning did not count some victims or throw the train from the track."

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—The Atchison (Kan.) *Patriot* says: "This company will introduce these new 'interest pay checks' on their next pay day, in accordance with a circular recently issued by the Treasurer. They are in the form of drafts or orders on the Treasurer by the Paymaster, some for \$50 and \$25 each, and some for odd amounts. Those for \$50 and \$25 bear interest at the rate of 4 per cent. per annum, if not presented for payment for four months, and at the rate of 5 per cent. per annum, if not presented till eight months from date, but will be cashed without interest at an earlier time. The object sought is to furnish employees a safe investment for a portion of their earnings, in a form that will give them a reasonable interest, combined with prompt convertibility in case of necessity. To the employees out on this line who are at a distance from banks and other means for the investment of their savings these checks will be especially welcome. It is expected that all merchants and banks between Atchison and Pueblo will take them at par."

Baltimore & Ohio.—A report in circulation that the Mount Clare shops in Baltimore were to be closed and the work taken to Cumberland has been denied by authority.

This company and the Adams Express Company have concluded an agreement by which both will hereafter maintain uniform rates on express matter to all competing points. There has been a sharp competition, especially to Cumberland and Wheeling, ever since the Baltimore & Ohio began to do the express business over its own lines.

The Baltimore *Gazette* of March 31 says: "Representatives of the Pullman Palace Car Company had a conference with the Baltimore & Ohio Railroad authorities at the Carrollton Hotel yesterday afternoon for the purpose of settling differences and adjusting the accounts of the two companies for the year that has just closed. Mr. George M. Pullman, Wirt Dexter and J. Kemmer, all of Chicago, were present as representatives of the Pullman, the two latter being the accountants of the company (Dexter is attorney, not accountant). The proposition of the Baltimore & Ohio to terminate their contract with the Pullmans and place on their lines palace and sleeping cars of their own construction, and the question of how far this would be an infringement of the Pullman patent came up for discussion, but resulted in nothing further than an expression of views on the subject."

Bangor & Piscataquis.—At the recent annual meeting the directors reported that the company now had in service 4 engines and 2 snow-plows; 3 passenger, 66 freight and 12 service cars. For the 13 months from Dec. 1, 1876, to Dec. 31, 1877, the earnings of the road were:

Gross earnings (\$1,514.80 per mile).....	\$76,497.36
Expenses (59.38 per cent.).....	45,422.27
Net earnings (\$915.35 per mile).....	\$31,075.09
Cost of changing gauge.....	14,477.73
Balance.....	\$16,597.36

The net balance is paid over to the city of Bangor to aid in meeting interest on city bonds issued in aid of the road. During the 13 months trains ran 70,914 miles, carrying 20,912 passengers, and 28,464 tons of freight.

Boston & Albany.—This Company has paid \$330,000 to the State of Massachusetts on account of the purchase of the South Boston flats. A further hearing is to be had on a disputed balance of \$80,000.

Canadian Pacific.—Ottawa (Canada) dispatches state that the track is now laid and engines running from Winnipeg to Selkirk, a distance of 21½ miles, and from Selkirk eastward, on section 14 of the main line, 50 miles. Tenders for track laying, bridging and ballasting between Winnipeg and Pembina have been before the Department of Public Works since March 1, and the contract will shortly be awarded. This gives 71½ miles, all told, in working order within Manitoba. At the eastern end of the line, Purcell & Ryan have pushed their work to a very advanced point, and expect to have the road built 113 miles westward from Thunder Bay this fall.

Central Pacific.—The San Francisco *Evening Post* describes as follows the local business of this road between that city and Oakland and the manner of conducting it: "The city of Oakland has running through one of its widest streets a double-tracked railroad, which was constructed in 1870, for the purpose of carrying people from the ferry landing at the end of Long Wharf to the eastern extremity of the city. Long Wharf is a substantial structure, extending from the western limits of Oakland, nearly two miles in length, toward Goat Island, and out to deep water, as the bay is very shallow and the wharf must of necessity be long, in order to accommodate the large ferry steamers and also vessels which are engaged in commerce.

"The distance from the end of Long Wharf to East Oak-

land is six miles. The first station reached after the trains have left the end of the wharf is Oakland Point. Here there are people living, who find it necessary to use the local trains and ferries, to the number of at least 3,000. The next station on the line is Centre street, which has now a population of, say 2,000, who use the local trains. Adaline street station comes next, and perhaps 1,000 people live adjacent to this, and take the cars here. Market street station comes next, and is second in importance to Broadway. No less than 4,000 people take the trains at Market street station. Of course, all these people do not go each day, but use the trains, more or less, during the week. At Broadway the bulk of the through travel to San Francisco takes the half-hourly trains. Above this point there is Oak street station, where a few of those living in the neighborhood take the trains—say 500. The next station is in East Oakland, at Clinton street, and is used by some of those living there, besides the vast crowds of picnickers which throng Badger's Park during the spring and summer pleasure season. Some distance, perhaps a quarter of a mile above here, is Brooklyn, or East Oakland, as it is now called, and the last station eastward, making eight stations in all in a distance of four miles.

"Now, it is simply proposed in this article to show how these trains are run which accommodate this vast number of people. There are thirty-four passenger trains run over this road each way every day. These trains are made up of an engine and 12 coaches. Each coach is arranged to carry an average of 60 passengers, so that if the entire 12 coaches run each trip were filled with passengers over 40,000 people would be carried in a day. But not so many people ride. There are probably 4,000 persons who hold commutation tickets, and ride to and from the city daily, while twice that number purchase single trip tickets. There are also four engines employed to haul these coaches, being the heaviest engines made, except those used on the mountain divisions of the Union Pacific and Central Pacific Railroads. The number of trainmen employed is 24 as conductors and brakemen, although the Westinghouse air-brake is used on each train. If none but those who cross the ferry were to ride on the cars of the local road it could be termed, and justly so, the most successful railroad in the world. The trains are run with such precision and regularity that it is rarely the case that one has to wait their arrival two minutes beyond the schedule time. But a great nuisance exists. At certain hours of the day the cars are thronged with people who only ride to and fro along the line for pleasure, and this is true more particularly on fine days, when in the afternoon, from one to four o'clock, hundreds of women, girls, a few men and young hoodlums occupy and fill up the seats to the exclusion of those people who are returning from the city, and are very tired, and who pay for and are entitled to a seat in the cars. It is estimated that no less than 3,000 deadheads ride in the cars every day, and on Sundays double this number, and the nuisance is on the increase to an alarming extent.

"It is proposed to pass a law giving to the railroad company the right to charge a nominal fare on the local roads. The *Post* reporter has made some inquiry since the matter was brought up for discussion, and finds a very wide-spread feeling in favor of it, not for the benefit of the railroad company, but for the accommodation and comfort of the people. The fare to the city would not be increased at all, but the comfort of the passengers would. It would cost the company as much in increase of trainmen and to collect a nominal fare as it would receive in fares, and would at once stimulate the construction of a horse railroad from West Oakland to Brooklyn, a charter for which was recently granted by the City Council. It would also prevent the hundreds of young hoodlums who infest the trains from doing so, and no legs would be amputated and no toes cut off, and very few accidents would occur."

Chicago & Pacific.—In the United States Circuit Court in Chicago, March 25, a hearing was begun in the Master's report in the foreclosure suit. Exceptions are taken by the company and the judgment creditors, who contest the validity of the mortgage and the right to foreclose.

Chicago & Alton.—The old Lichfield suit against this company came to trial in the Illinois Circuit Court at Bloomington recently. The suit has been pending a long time and its history is thus given by the *Bloomington Pantagraph*:

"The Lichfield claim rests on a purchase of the railroad at a mortgage sale in December, 1856. The mortgage that was closed out at that sale was made in January, 1857, by the railroad company to Messrs. Brown, Fullerton and Keating, trustees to several hundred thousand dollars of debts owing by the road. This mortgage was made subject to three prior mortgages that had been given by the company, amounting to \$4,500,000, and also subject to a lease of the road in 1855, to Hamilton Spencer, of Bloomington, for 20 years. Default having been made in the payment of this fourth mortgage, the trustees above mentioned advertised and sold the road in December, 1856, subject to the incumbrances mentioned. It was bought for \$5,000 by the complainant, Lichfield, and ex-Governor Matteson. A new corporation was then formed by an act of the Legislature, the St. Louis, Alton & Chicago Railroad Company, consisting of Matteson, Lichfield, Spencer and six other persons named in the act. Governor Matteson transferred his interest, acquired by the sale, to this new corporation, but Lichfield did not. Lichfield was, however, one of the incorporators of the new corporation, became one of its directors, and he and Matteson issued circulars, in their own name and in the name of their new corporation, to the bondholders of the old corporation, urging them to cancel their old bonds and subscribe for bonds of the new corporation instead. Subsequently, the three mortgages that were ahead of the one under which Lichfield bought, were foreclosed in the United States Circuit Court, in Chicago, and from the sales made in those proceedings, through a succession of transfers afterward made, comes the title of the present Chicago & Alton Company to the road. Lichfield was not party to those foreclosure proceedings; but the corporation of which he was a member, and which took and assumed the ownership of the road, was made a party. He claims that he is entitled to an undivided half of the road from Joliet to Alton freed from liens, inasmuch as the debts for which it was sold in the United States Court, in Chicago, have long since been paid.

"The railroad company deny that Lichfield took any rights under the sale of the road in 1856. They say that the mortgage given to Brown, Fullerton and Keating was fraudulent, and that the lease to Mr. Spencer was void, and also that the sale at which Lichfield and Matteson bought was void. They claim as to the sale, that the power of sale could only be exercised by all three of the trustees joining in the sale, whereas, not one of them was present; the sale having been made by Clarkson N. Potter, their attorney. The railroad company further say that when Lichfield became a member of the new corporation that was authorized by the legislature to own and possess the franchises of the old one, and when he issued circulars to the bondholders of the old corporation, he was estopped from setting up any individual claim of his own to the property. They further claim that whatever rights he might have acquired under the sale in 1856, were barred and foreclosed by the decree in the United States Court in Chicago, where the St. Louis, Alton & Chicago Railroad Company was made a party.

"The above is a brief outline of the case, although there are a number of other items and legal propositions that enter into it. Judge Reeves passed upon the case at once, holding that Lichfield's rights were barred by the Chicago decree, and that he is not entitled to anything under his purchase.

"It is proper to say that shortly before Mr. Lichfield's death he was placed in bankruptcy by his creditors, and the suit since that time has been conducted by his assignee in bankruptcy. It is not certain that the case will go to the Supreme Court inasmuch as it is a hazardous claim, and the original claimant in the case is dead. The general impression is that the suit will end where it now stands."

Chicago & Northwestern.—This company is now paying at the Treasurer's office in New York the La Crosse, Trempealeau & Prescott bonds which matured April 1. The amount of these bonds is \$1,000,000, and provision was made for their payment by the sale of an equal amount of consolidated bonds.

Cincinnati & Eastern.—A section of the New Richmond Branch, from Batavia, O., south by west to Tobasco, seven miles, has been completed and opened for business. Work on the branch is progressing well and the remaining eight miles to New Richmond are nearly ready for the rails.

Cincinnati, Rockport & Southwestern.—Mr. E. V. Cherry, Secretary, writes us as follows:

"The above-named road has been reorganized and taken out of the hands of the Receiver. The old bonds and mortgage have been canceled, and new mortgage 6 per cent. gold bonds for \$300,000 have been issued. The road will be extended at once from present terminus (Ferdinand) to Jasper, Ind., a distance of 14 miles, making a total of 40 miles."

Columbus, Chicago & Indiana Central.—The Trustees and Receivers give notice that they will pay at the office of A. Iselin & Co., No. 48 Wall street, New York, the coupons due Oct. 1, 1877, on Union & Logansport 7 per cent. bonds, and those due Jan. 1, 1878, on Indiana Central 10 per cent. bonds.

Delaware & Hudson Canal.—Notice is given that the canal will be opened for navigation April 11, and that 70 cents per ton will be paid for carrying coal from Honesdale to Rondout. This is the same price as last year.

Denver Pacific.—The suit brought by the Commissioners of Arapahoe County, Col., which is a large stockholder in this road, has been renewed in the United States Court, and on April 2 the Court appointed D. M. Edgerton and G. W. Clayton, Receivers. The road is 106 miles long, from Denver to Cheyenne, and has been controlled by the Kansas Pacific.

East Line & Red River.—Contracts have been let for an extension of 20 miles from Pittsburgh, Tex., westward, the work to be finished by July 1. This extension will take the road to a point within 20 miles of Sulphur Springs.

Holly Springs, Brownsville & Ohio.—The track on this narrow-gauge road is now laid from Brownsville, Tenn., on the Memphis Line of the Louisville & Nashville, north 10 miles, and work is progressing steadily, the grading being done for some distance further.

International & Great Northern.—In Washington, April 2, Justice Bradley, of the United States Supreme Court, sitting in Chambers, granted an application made by the trustees under the consolidated mortgage, for the appointment of a receiver. With the consent of the trustees he then appointed to that position Mr. R. S. Hayes, now Vice-President of the company. The company, which was formed in 1873 by the consolidation of the International and the Houston & Great Northern companies, owns some 520 miles of railroad in Texas; there are \$7,348,000 first-mortgage bonds issued by the two companies before consolidation, and \$5,510,000 consolidated or second-mortgage bonds, on which interest has been in default since January, 1874. The complaint of the trustees alleges that the net earnings last year were \$505,000, barely sufficient to pay interest on the first-mortgage bonds, and that the company has also a floating debt of \$500,000.

Joliet & Northern Indiana.—At a meeting held in New York, March 30, holders of about \$300,000 of the bonds were present. It was resolved to accept a proposition made by the Michigan Central, lessee of the road, to issue new 7 per cent. bonds, principal and interest guaranteed, in place of the present bonds, which matured some time ago. A committee was appointed to collect the old bonds and make the exchange. The Joliet & Northern Indiana Company, whose stock is held by the lessee, is to bear all the expenses of the litigation in the matter.

Kansas City, Burlington & Santa Fe.—The track on this road was laid across the Neosho River at Burlington, Kan., March 25, and connection made with the Missouri, Kansas & Texas. The whole length of the extension from Williamsburg to Burlington is 29 miles, making the road 42 miles long from the junction with the Leavenworth, Lawrence & Galveston near Ottawa.

Lockport & Buffalo.—In Buffalo last week the Supreme Court granted the application of this company and appointed commissioners to determine where and in what manner the road may cross the New York Central tracks near Niagara Falls.

Manchester & Keene.—The contract for the remaining work on this road from Hancock, N. H., west by south to Keene, about 17 miles, has been let to John H. Dame, of Waltham, Mass., and George Bounallie, of Lewiston, Me.

Missouri & Western.—This company has completed and opened for business a branch from Oronogo, Mo., to Joplin, eight miles long. This will bring the road into competition with the Joplin Railroad for the business of the extensive lead mining region about Joplin.

Natchez, Jackson & Columbus.—The track on this road has been laid to Red Lick, Miss., 8½ miles beyond the late terminus at Fayette, and 34½ miles east by north from Natchez. The most expensive work on this extension is an iron bridge of 104 feet span over Cole's Creek. This extension reaches two important country roads over which much freight is now hauled by teams to Rodney and Port Gibson.

New Orleans Pacific.—The Louisiana District Court has refused to grant a writ of *mandamus* to compel the Governor of the State to sign the bonds to be issued under the act of the Legislature granting \$2,000,000 aid to the road. The case will be at once taken to the Supreme Court.

New York Central & Hudson River.—In the long-contested suit between this company and the Collector of Internal Revenue, a jury at Utica, N. Y., last week rendered a verdict of \$499,432 for the road. The Court granted a stay of proceedings for 60 days to enable the defendant to prepare a bill of exceptions. The suit is to recover a tax assessed upon an issue of scrip which the collector regarded as a dividend within the meaning of the internal revenue law.

New York Terminal Facilities.—The New York Board of Aldermen has passed the ordinance allowing the use of the Belt (street) Railroad for freight cars and the construction of sidings to connect its tracks with warehouses and docks adjoining. The ordinance provides that cars shall be drawn by covered dummy engines, with not more than 10 cars in a train, and the use of the tracks for this purpose is allowed only from 7 p. m. to 4.30 a. m. from April 15 to Sept. 15, and from 6 p. m. to 4.30 a. m. from Sept. 15 to April 15. The use of the tracks is to be open to all companies, but the New York Central & Hudson River is the only one likely to make much use of them at present.

Ohio & Mississippi.—A meeting of the Reconstruction Committee was held in Baltimore last week, at which several plans were presented and discussed, looking to a restoration of the property to the control of the stockholders, and while no definite plan was agreed upon the fact was developed that the committee are a unit on recommending measures for taking the road out of the Receiver's hands at the earliest possible date. It was understood that the bondholders would avoid pressing extreme legal rights if matters could be so arranged as to enable the company in time to be put in a position to discharge all its obligations. Under the management of the Receiver a considerable amount of the floating indebtedness has been paid off, and the equipment of the road is in an excellent condition for business should its financial credit be restored. The committee adjourned to meet in New York.

Peoria, Pekin & Jacksonville.—The Illinois Circuit Court at Peoria on April 1 granted a petition for the appointment of a receiver for this road, and selected for that position Mr. John Allen, President of the company. The application is stated to have been made for the protection of the owners of the property and in consequence of the great loss of business last fall and winter. The road is 83 miles long from Peoria, Ill., to Jacksonville, and had, by the last report, \$1,000,000 first and \$1,000,000 second-mortgage bonds outstanding. Default was made for the first time on the coupons due Jan. 1.

Philadelphia & Reading.—This company's report for February is as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Gross receipts.....	\$844,470	\$1,216,000	D. \$371,530	30.6
Passengers carried.....	309,057	430,853	D. 31,796	7.3
Tons freight carried.....	237,282	239,657	I. 7,025	3.3
Tons coal carried.....	173,402	321,655	D. 148,193	46.1
Tons coal mined.....	93,727	187,119	D. 93,392	49.9

The decrease in the receipts is due to a voluntary suspension of the production of coal to a great extent, in order to increase their allotment hereafter. The business for the first three months of the fiscal year shows an increase of \$284,649 over the same period of last year.

Pine Hill.—The Pine Hill Coal Company has begun work on a railroad eight miles long, from a point on the Louisville & Nashville Knoxville Branch in Rockcastle County, Ky., to the coal fields on Skaggs Creek. The completion of this branch will open up several mines not now worked for want of transportation.

Pittsburgh, Titusville & Buffalo.—The Titusville (Pa.) Herald says: "It is rumored that the through freight north of Oil City will at an early day be sent over the River Division of the Pittsburgh, Titusville & Buffalo road, through Irvineton over the Buffalo & Jamestown road to Buffalo, instead of via Titusville, Corry and Brocton as at present."

"The Pittsburgh, Titusville & Buffalo road have a heavy contract for coal with the Grand Trunk road at Buffalo, which takes one train a day to deliver. They have also a contract for supplying the New York Central road, which takes two trains per day."

"We also hear that the sleeping-car from Pittsburgh will go through to Buffalo by way of Irvineton, instead of stopping at Titusville. It is said that the Buffalo & Jamestown road have about perfected their arrangements at Falconer, the junction of the Buffalo & Jamestown road with the Dunkirk, Allegheny Valley & Pittsburgh road, by which they can run their trains to Irvineton, where they will connect with the Pittsburgh, Titusville & Buffalo road."

"The object to be accomplished is alleged to be to get a low grade route for freight and to avoid the change of passengers at Brocton with the Lake Shore. The Cross-Cut road is now in the hands of the court, it is said, and will soon be sold, and it is doubtful if the Valley road will buy it if the above arrangement is carried out. The running of passenger trains between here and Corry is not likely to be sensibly affected. The travel, both by this route to Bradford and the east and west is very large. The Cross-Cut road is likely to be operated by some interest, as the laws of New York State will not allow it to be abandoned, and it is an important feeder to the Lake Shore the year round and in summer to the Chautauque Lake business."

South Carolina.—The committee appointed at the recent meeting have agreed upon a plan providing for the execution of a consolidated mortgage and the issue of consolidated bonds for which the present second-mortgage bonds are to be exchanged at 50 cents on the dollar, and the non-mortgage bonds at 40 cents. It is believed that interest can be paid without difficulty on the reduced amount.

Springfield, St. Paris & Sydney.—This company has been organized to build a narrow-gauge road from Springfield, O., northwest to Sydney, about 35 miles. The capital stock is to be \$200,000.

Springfield, Troy & Piqua.—A company by this name has been organized to build a railroad from Springfield, O., west by north to Piqua, about 30 miles. The capital stock is to be \$200,000.

St. Paul & Pacific.—The St. Paul Pioneer-Press says: "We learn from Mr. J. J. Hill that arrangements were made while in New York and Montreal for going right to work with the construction and completion of the St. Vincent Extension, and of the line from Melrose to Alexandria. We are informed that it is not probable that they will let any contract for building the road. They are so well satisfied with Manager Farley's success in building the Breckinridge Cut-off, for from six to seven thousand dollars per mile, that they will probably build the rest of the road in the same way, without the intervention of contractors. The St. Vincent Extension will be completed to the boundary line by October, and the Canadian Government have perfected arrangements for the simultaneous completion of the Pembina Branch of the Canadian Pacific. So that by the first of November, at farthest, the cars will run straight from St. Paul to Winnipeg. There is no doubt that satisfactory arrangements will be made between the Canadian Government and the St. Paul & Pacific people for running the through trains of the St. Paul & Pacific over the Pembina Branch. Such newspaper opposition as there is to this arrangement was inspired by party motives in ignorance of the real situation; but as Manitoba has an urgent and pressing interest in this connection, no political party will be likely to oppose an arrangement so imperatively demanded by the interests of that young and flourishing province."

Standard Oil Company.—In the suit of H. L. Taylor & Co. against this company the Butler County (Pa.) Circuit Court has, on application of plaintiffs, appointed commissioners to take testimony. They are authorized to go fully into all matters in dispute, including contracts, rebates, and other agreements.

Syracuse, Binghamton & New York.—In London, March 16, Messrs. Morton, Rose & Co. invited subscriptions for the 7 per cent. first consolidated (currency) mortgage, to the amount of \$1,750,000, in \$1,000 bonds, at the price of \$200 per bond, principal and interest being guaranteed by the Delaware, Lackawanna & Western Railroad Company. The issue is made to replace \$1,400,000 bonds paid off and to provide additional equipment; and it forms a first mortgage on 81 miles of line from Syracuse to Binghamton. There is, however, a lien of \$270,100. The first coupon is due on Oct. 1, and the principal is repayable in 1906. The same bonds were put on the New York Stock Board list last week.

Utica & Black River.—The contract for grading the extension from Morrisstown, N. Y., northeast to Ogdensburg has been let to James T. Campbell, of Lowville, N. Y. The distance is 10.63 miles.

Wabash.—This company has put on a line of sleeping cars to run through between St. Louis and Boston over its road, the Canada Southern, the New York Central and the Hoosac Tunnel Line. The cars leave St. Louis daily at 6:50 p. m. and arrive at the Fitchburg depot in Boston at 2:40 p. m. on the second day. This is believed to be the longest line of sleeping cars now running without a change, the distance being 1,208 miles. The route is equipped with new cars.

Wheeling & Lake Erie.—This company seems to be trying a variety of expedients to get rid of its difficulties. The latest statement is that, by order of the board, a petition in bankruptcy has been filed in Huron County, O., where the only completed section of the road is.

ANNUAL REPORTS.

Delaware & Bound Brook.

The following statements are contained in the annual report filed with the Comptroller of New Jersey for the year 1877. The road consists of a main line from Bound Brook, N. J., southwest to the Delaware River, 27 miles, double track, with a branch to Trenton, 3.7 miles. The main line forms about one-third in length of the New York & Philadelphia New Line. The equipment owned is 7 engines, 12 passenger, 3 baggage, 22 box and 90 flat cars. Other equipment is furnished by the Central of New Jersey and North Pennsylvania companies, which own the rest of the line:

Stock (\$49,316 per mile).....	\$1,514,000.00
Funded debt (\$48,860 per mile).....	1,500,000.00
Floating debt.....	259,033.08

Total (\$106,613 per mile).....\$3,273,033.08

Cost of road and equipment (\$97,656 per mile).....2,988,046.08

The earnings for the year were as follows:

Passengers.....	\$122,438.01
Freight.....	115,138.83
Other sources.....	889.99

Total (\$7,767.65 per mile).....\$238,466.83

Expenses (71.89 per cent.).....171,422.18

Net earnings (\$2,183.86 per mile).....\$67,044.65

The net earnings were 2.05 per cent. on the stock and debt. No comparison is made with 1876, the road having been worked only a part of that year.

Central, of New Jersey.

The only report yet made by this company for the year 1877 is the brief statement filed with the Comptroller of New Jersey. This covers only the 74 miles of main line and 70 miles of branches in New Jersey, and includes no statements of traffic. It is compared below with the similar statement for 1876.

The stock and debt at the close of the two years were as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Stock.....	\$20,600,000.00	\$20,600,000.00		
Funded debt.....	24,700,000.00	24,700,000.00		
Other debt.....	6,331,115.77	5,250,017.81	I. 1,081,097.96	20.6

Total.....\$51,631,115.77

Main Line, Newark and Perth Amboy branches.....\$13,768,242.64

Jersey City station.....1,315,805.50

Port Johnson coal station.....873,297.09

Elizabethport station.....450,146.10

Station houses, shops, etc.....824,850.42

Equipment.....2,851,370.00

Total.....\$20,083,711.75

The earnings and expenses were as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Passengers.....	\$1,409,850.14	\$1,404,607.64	D. \$5,242.50	5.7
Merchandise.....	1,008,758.30	903,152.99	I. 105,605.31	11.7
Coal.....	1,172,347.61	1,512,754.19	D. 340,406.58	22.5

Mail, express, rents, etc.....129,230.23

Total.....\$3,720,185.28

Running exps.....\$4,077,795.91

Fuel consumed.....180,924.11

Repairs of road, docks, etc.....438,659.85

Rep's of equipment.....265,702.99

Ferry expenses.....137,623.46

Miscellaneous.....233,453.02

Total.....\$2,171,037.91

Net earnings.....\$1,549,157.37

Gross earn. per mile.....25,834.60

Net earn. per mile.....10,758.04

Per cent. of exps.....58.36

The statement made with the report of the Reconstruction Committee of the earnings of the entire road was as follows:

	1877.	1876.	Decrease.	P. c.
Gross earnings.....	\$5,559,069.00	\$6,983,172.32	D. \$1,324,103.32	19.0
Expenses.....	3,209,697.46	3,794,704.45	D. 585,006.99	15.4

Net earnings.....\$2,349,371.53

These figures indicate a much greater proportional loss on the Lehigh & Susquehanna than on the New Jersey Division.

Cleveland & Pittsburgh.

This company's lines extend from Rochester, Pa., to Cleveland, O., 124 miles; from Yellow Creek, O., to Bellaire, 42.75 miles, and from Bayard, O., to New Philadelphia, 32.75 miles, making 199.50 miles. Its trains run over 26 miles of the Pittsburgh, Fort Wayne & Chicago from Rochester to Pittsburgh, making 295.50 miles worked. The whole

property is leased to and worked by the Pennsylvania Company.

The company's balance sheet Dec. 31, 1877, was as follows:

Stock (\$56,360 per mile).....	\$11,243,757.82
Bonds (\$25,580 per mile).....	5,104,343.63
Income account.....	682,103.65
Accounts and balances due.....	373,599.28

Total (\$87,137 per mile).....\$17,383,804.36

Road and equipment (\$82,650 per mile).....\$16,488,681.08

Cash assets, balances due.....633,913.28

Materials account with lessee.....261,210.00

Total.....\$17,383,804.36

The company's receipts, apart from the rental paid by the lessee, were as follows:

Interest and dividends.....	\$6,303.51
Settlement of suits, etc.....	\$9,053.22
Old accounts charged off.....	29,802.00

Excess of charges.....\$32,551.71

This represents a corresponding reduction in the nominal amount of assets held. The various sinking funds were increased by \$58,251.73 during the year.

The earnings for the year, as reported by the lessee, were:

	1877.	1876.	Inc. or Dec.	P. c.
Passengers.....	\$460,745.30	\$525,554.20	D. \$64,808.90	12.3
Freight.....	1,766,227.68	1,045,274.25	I. 1,205,953.43	7.4

Mail, express, etc.....103,860.68

Pittsburgh, Fort Wayne & Chicago on joint freight account.....61,492.07

Total.....\$2,392,325.73

Expenses.....1,291,662.18

Net earnings.....\$1,100,663.55

Gross earnings per mile.....10,608.98

Net earnings per mile.....4,925.34

Per cent. of exps.....53.90

The net result to the lessee was as follows:

Net earnings.....	\$1,100,663.55
Guaranteed interest, dividends, etc.....	\$1,243,950.69
Sinking funds.....	63,824.00

Total.....\$2,408,438.24

Loss to lessee.....\$207,111.14

The loss to the lessee in 1876 was \$212,416.92, or \$5,305.78 less than in 1877. In every previous year the net earnings exceeded all charges, leaving a profit on the lease. The President, in his report, states that the results would have been had the road been worked by the company:

"These results are regarded as very favorable under the existing situation, being an earning of 5 1/4 per cent. on the capital stock after deducting interest on bonds, rental paid to Pittsburgh, Fort Wayne & Chicago Railway, and sinking fund contributions as follows:

Total income.....	\$2,392,325.73
Operating expenses.....	\$1,291,662.18
Interest on bonds.....	346,371.11
Lease of track and interest P. F. W. & C. Railway.....	100,652.05
Sinking funds.....	63,824.00

Total expenditures.....\$1,802,569.34

Balance applicable to dividends.....\$589,816.39

being 5 1/4 per cent., as above stated, on \$11,240,934—the amount of outstanding capital shares, after reducing the \$19,800 of old certificates outstanding to their equivalent in the guaranteed 7 per cent. shares."

Rome, Watertown & Ogdensburg.

This company works the following lines:

	Miles.
Rome, N. Y., to Ogdensburg.....	141.11
Cape Vincent Branch.....	24.24
Friedman Branch.....	24.28
Syracuse Div., Syracuse to Sandy Creek.....	44.50
Lake Ontario Div., Oswego to Lewiston.....	146.17

Total owned.....380.30

Oswego & Rome R. R., leased.....28.58

Total worked.....408.88

There are 54.74 miles of second track and sidings. The Syracuse and Lake Ontario divisions have been added to the road by purchase and construction within the last few years. The following figures are from the report to the New York State Engineer for the year ending Sept. 30, 1877.

The stock and debt are as follows:

Stock (\$8,277 per mile).....	\$3,147,000.00
Funded debt (\$20,378 per mile).....	7,749,000.00
Floating debt.....	734,585.24

Total (\$30,324 per mile).....\$11,532,085.24

Cost of road and equipment (\$24,507 per mile).....\$9,321,314.45

The cost of the Syracuse and Lake Ontario divisions was \$5,321,314.45. During the year the funded debt was increased by \$503,000, and the floating debt by \$140,400; cost of road and equipment increased \$601,016.07.

The earnings for the year were as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Passengers.....	\$480,102.27	\$508,092.56	D. \$27,990.29	5.5
Freight.....	682,827.85	631,674.24	I. 51,153.61	8.1
Other sources.....	92,341.19	88,290.21	I. 4,050.98	4.6

Total.....\$1,255,271.31

Expenses.....912,134.46

Net earnings.....\$343,136.85

Gross earnings per mile.....3,070.02

Net earnings per mile.....839.21

Per cent. of exps.....72.06

Payments other than for working expenses were:

Net earnings.....	\$343,136.85
Interest.....	\$554,700.80
Rental, Oswego & Rome Railroad.....	24,000.00

Total.....\$921,837.65

Excess of payments.....\$578,700.80

As noted last week, the company defaulted on the coupons due April 1, 1878, on its consolidated bonds, promising to continue payment on the prior issues. In the last few years the mileage has been increased by 190.67 miles, but the earnings have not shown any corresponding gain. For 1870-71 the gross earnings were \$1,399,515; net profits, \$394,311, while in that year the interest payments were only \$130,264, leaving a surplus sufficient to pay 8 per cent. dividend on the stock. The new lines have a thin traffic, while that of the older parts of the road has been diminished by increased competition, and partly also by the general depression of business.